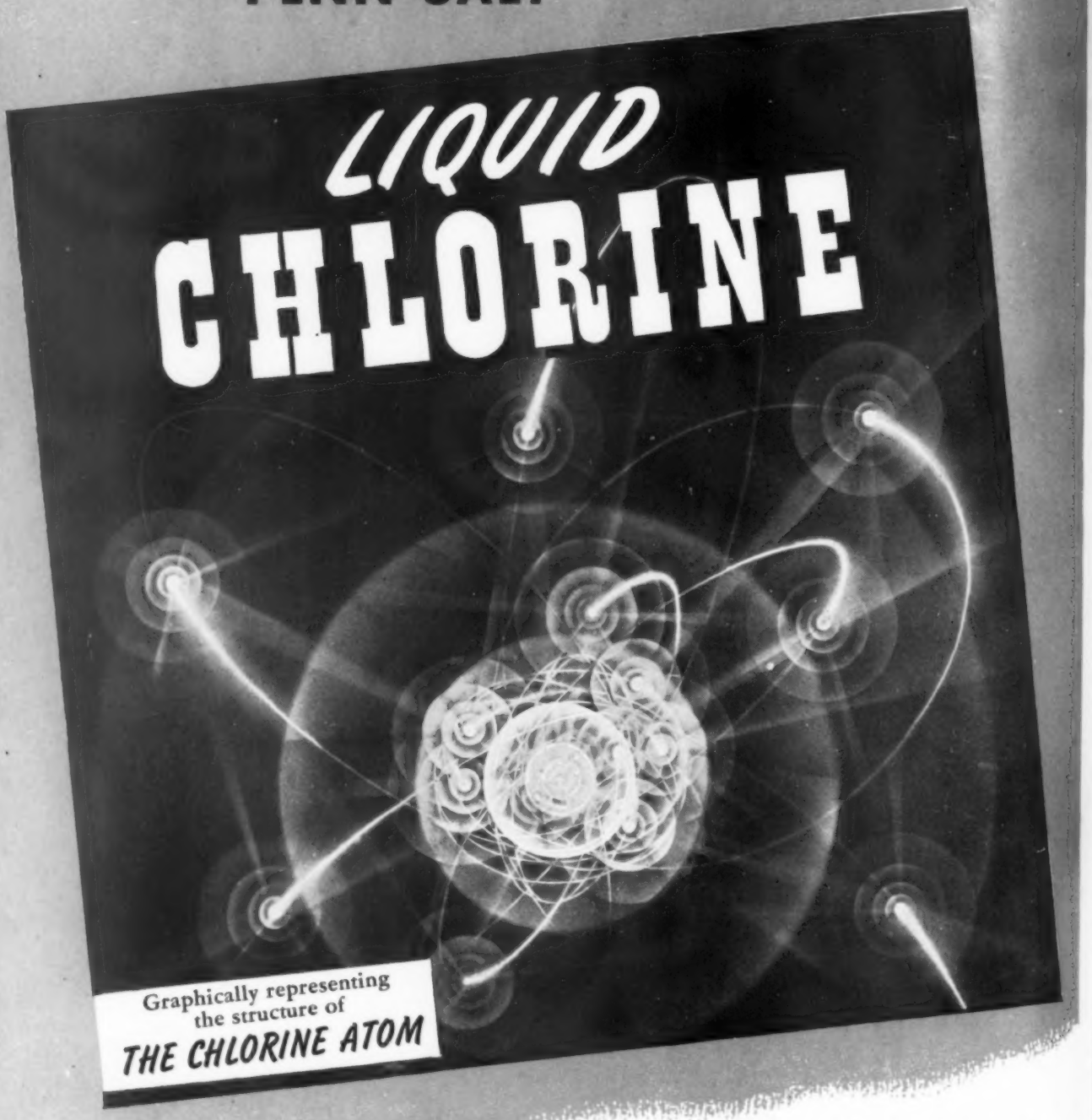
WATER & SEWAGE WORKS

WATCH-FOB PLANT OF 1945

Many of these modern "package plants" are providing activated sludge treatment for small populations on a practical basis.

PENN SALT

LIQUID CHLORINE



Graphically representing the structure of THE CHLORINE ATOM

PENN SALT LIQUID CHLORINE is valuable in water purification, swimming pool sanitation, sewage treatment, slime prevention and control. Write for full information.

OTHER PENN SALT PRODUCTS INCLUDE

Anhydrous Ammonia
Filter Alum
Ferric Chloride
Sodium Aluminate
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Strong today, Rockwell Manufacturing Company will grow in stature—for the individual efforts of its Divisions and Subsidiaries will be coordinated and strengthened by the collective vision, research, productive capacity, and distribution facilities of the group as a whole.

Rockwell Manufacturing Company—today a new name in American industry—planning ahead that tomorrow will find its distinctive trade mark a nationally recognized symbol for excellence on an increasingly long list of products.

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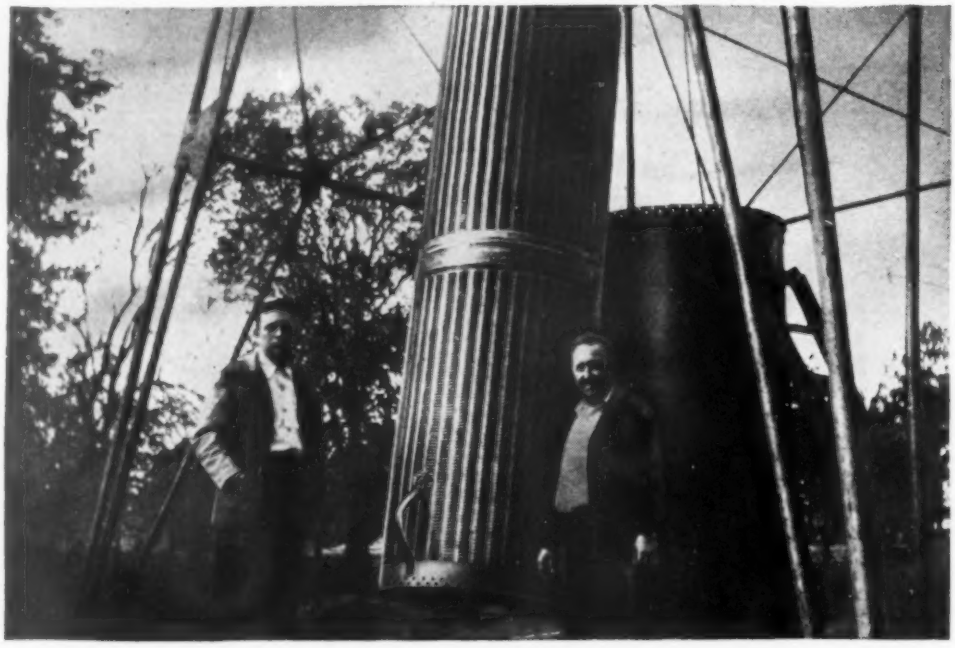


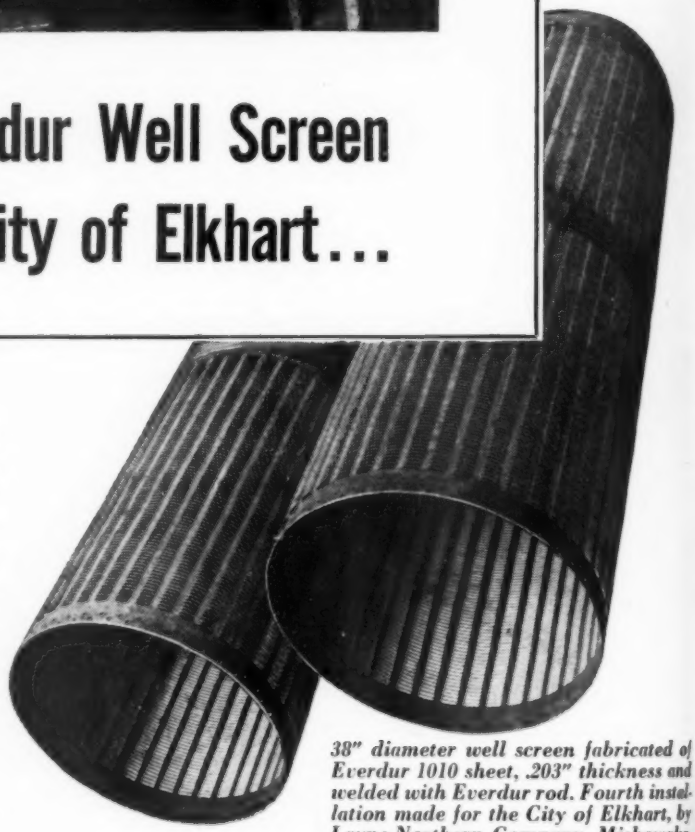
The FOURTH Everdur Well Screen installed for the City of Elkhart...

NINE YEARS AGO the Layne-Northern Company, Mishawaka, Indiana, installed two wells for the City of Elkhart . . . using well screens made of Everdur*. Because of the high strength and corrosion resistance of this copper-silicon alloy, these two wells have shown no appreciable drop in water yield, although wells with screens of other materials became clogged in a relatively short time.

Two more wells subsequently installed by Layne-Northern were therefore equipped with Everdur. The snapshot above shows the latest installation, with an Everdur well screen ready to be lowered into position. Standing by are Mr. Richard B. Corns (left), Waterworks Superintendent, and his assistant, Mr. Swartz.

The performance of these Everdur well screens is typical of the service rendered by sewage treatment and waterworks equipment made of this tough, corrosion-resistant alloy... installations of which are still in service after 18 years. For detailed information, write for Publications E-11 and E-6. 46200

*Reg. U. S. Pat. Off.



38" diameter well screen fabricated of Everdur 1010 sheet, .203" thickness and welded with Everdur rod. Fourth installation made for the City of Elkhart, by Layne-Northern Company, Mishawaka, Ind., affiliate of Layne & Bowler, Inc., Memphis, Tenn.

ANACONDA *Everdur*

COPPER-SILICON ALLOY

THE AMERICAN BRASS COMPANY
General Offices: Waterbury 88, Connecticut
Subsidiary of Anaconda Copper Mining Company
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PRODUCTS OF SELECTIVE DEVELOPMENT . . .

Matched in Appearance-Specialized in Performance

BUILDERS *Gauges*

HARNESS RACER

Specialist in trotting races, "Greyhound" covered the mile in 1:55¼.

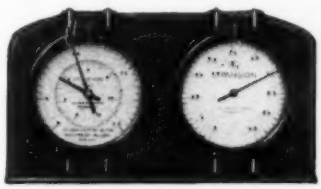
RUNNER

Thoroughbreds on the race track have been timed at 1:35.

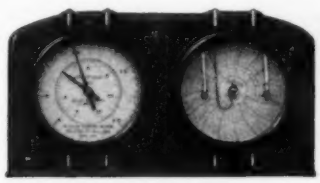
OPEN JUMPER

Spectacular performer, "Greatheart" made a record high jump of 8′ 13/16″.

In America's finest instruments — as in America's finest horses — exceptional performance is complemented by handsome appearance. Uniform, smartly designed BUILDERS Gauges enhance the appearance of waterworks plants and reflect efficient operation. Each instrument, though similar in appearance, performs its own highly specialized duty . . . conveying accurate information on loss of head, rate of flow, water level and sand expansion. BUILDERS Gauges furnish important operating information for efficient filter control.



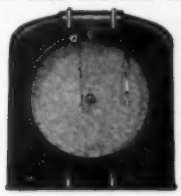
MODEL GA9X-I
Gauge indicating loss of head, rate of flow and sand expansion.



MODEL GA82-IR
Gauge indicating and recording loss of head and rate of flow.

MODEL GA7-I
Gauge indicating loss of head.

MODEL GA8-I
Gauge indicating loss of head and rate of flow.



MODEL GA1-R
Gauge recording loss of head, rate of flow or water level.

Single dial gauge mounted on matching floorstand; stand also available for double dial gauges.

The mechanism of BUILDERS Gauges is simple and durable, approved by leading waterworks engineers. Indicating dials are machine-engraved; charts are printed on special moisture-resisting paper; indicators and charts have uniformly-spaced graduations over the entire measuring range.

Other* BUILDERS *Products

Venturi, Propeloflo and Orifice Meters • Type M and Flo-Watch Instruments • Filter Controllers • Master Controllers • Kennison Nozzles • Chronoflo Telemeters • Conveyor Scales.

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Builders Rate Controller

Direct acting type, used with BUILDERS Gauges for perfect rate control. Trouble-free, long-lived, superior design and BUILDERS Quality.

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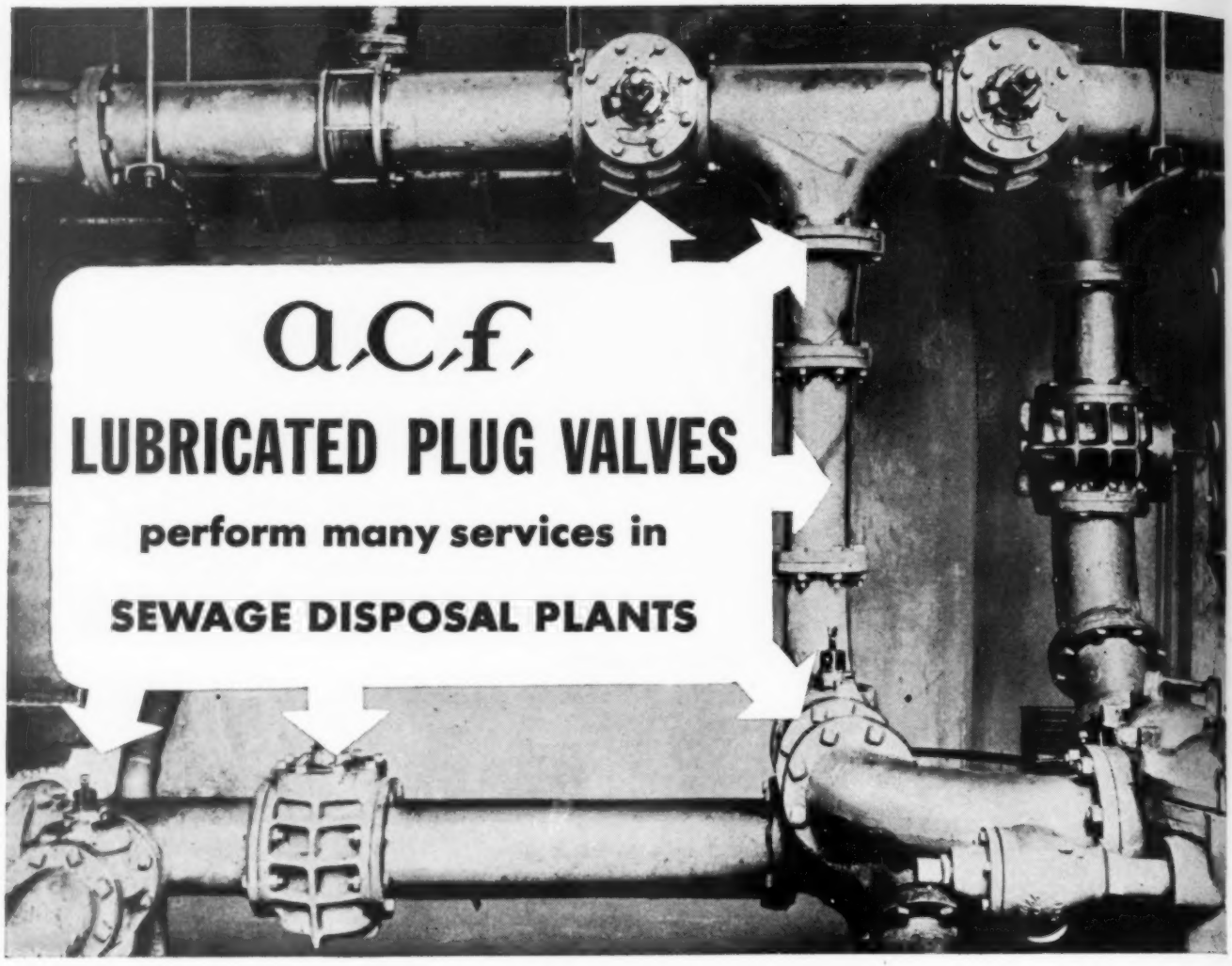


a.c.f. Lubricated Plug Valves handling sludge in pump house at City of New York-Jamaica sewage disposal plant.

- Air lines to diffuser plates in the sedimentation tank influent channels.
- Suction and discharge sides of raw sludge pumps.
- All sludge, supernatant, and overflow lines at the digestion tanks.
- Hot water circulating lines at the digestion tanks.
- Sludge and water lines at the elutriation tanks.
- Elutriation pumps.
- Filter sludge feed tank draws.
- Sludge sampling cocks.
- Sludge gas valves in the gas control house.
- Gas shut off valves in the boiler room.

MODERNIZE

YOUR SEWAGE DISPOSAL PLANT WITH a.c.f. LUBRICATED PLUG VALVES

We can supply new plug valves with the same face-to-face dimensions as existing gate valves now in use.

No added expense is involved in revamping of piping or positioning of pumps, motors, or other installations.

Write for catalogue 3(W)

AMERICAN CAR AND FOUNDRY COMPANY

Valve Department

30 Church St., New York 8, N. Y.

can help you work out some maintenance puzzles

Every treatment plant has had its maintenance problems during the past few years, and every engineer is naturally concerned with avoiding such troubles in the future. With a big repair program ahead, there has never been a better time to take positive action by putting the *right* materials in the *right* place.

Among the many places where proper material selection is a major factor in determining durability and where leading engineers generally use wrought iron, are:

. . . Digestor heating coils. Here the normally high corrosive action of sewage is increased by temperature. Wrought iron is a favored material for this service.

. . . Air Lines. One large plant installed over 10 miles of wrought iron pipe in 1925, to avoid replacements and eliminate danger of clogging from loose rust. Satisfaction can be judged by the repeat order for wrought iron when the plant was enlarged 10 years later.

. . . Gas Lines. Hydrogen sulfide and carbon dioxide form corrosive acids. Wrought Iron is highly resistive to this attack.

. . . Stirring Mechanisms. In one reported instance, the original installation, made of ordinary material, failed in one year. Wrought Iron, used for replacement, was still in service after 6 years at last report.

. . . Manhole Ladder Steps. Wrought Iron is saving for dozens of municipalities in this service.

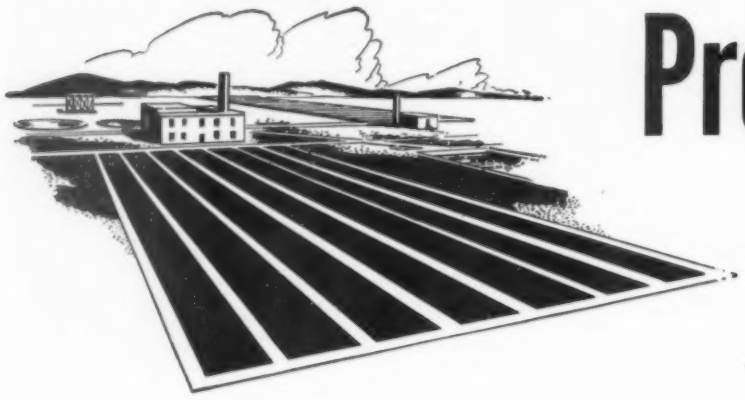
These examples are only a few of many, but will serve to indicate the contribution that wrought iron can make. The unusual durability of the material is due to its unusual structure—tiny fibers of glass-like silicate slag threaded through a body of high-purity iron. Corrosion is halted and dispersed by these fibers, discouraging pitting. The fibers also anchor the initial protective film, which shields the underlying metal.

You will find some helpful information in our bulletin, "Wrought Iron for Sewage Treatment and Disposal Installations." And you will find wrought iron available now, in any quantity, for any project.

A. M. Byers Co., Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Chicago, St. Louis, Houston, Seattle, San Francisco, Atlanta.

CORROSION COSTS YOU MORE THAN WROUGHT IRON

Getting Maximum Value from Pre-Aeration



THE efficiency of primary treatment is noticeably improved by aeration of raw sewage prior to settling. Its principal advantage, of course, is the separation of grease. It also provides more effective odor control. Partial coagulation of organic solids makes possible greater solids removal and reduction of B. O. D. in settling tanks.

The very heart of pre-aeration are the air diffuser units. Their permeability, size, shape and other characteristics determine, to a large extent, the operating value of the entire installation. Yet, there are no hard set rules governing their selection. Each application depends upon the particular conditions of the individual treatment problem. Sewage characteristics, plant location, and tank design are only a few important variables influencing choice and installation of diffusers. Each must be accurately weighed to determine the best diffusers to use.

Welcoming the opportunity to advise on specifications, installation and operation of diffusers are trained engineers of The Carborundum Company. Their experience in the field has given them a broad knowledge of successful porous diffuser applications.

This service is practically designed to aid you. Designers, engineers, superintendents and others have experienced its soundness. Feel free to consult with us. Write Dept. O-26. The Carborundum Company, Refractories Division, Perth Amboy, N.J.

DIFFUSER MEDIA

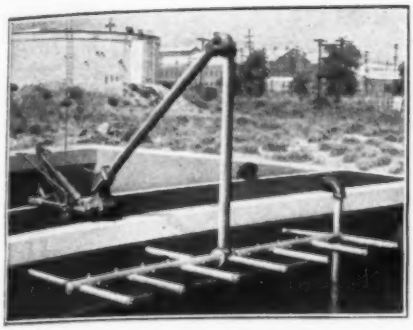
BY **CARBORUNDUM**

TRADE MARK

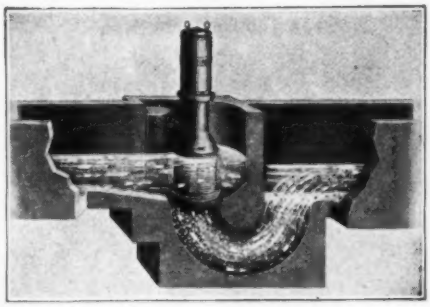
"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company

Modernization Musts

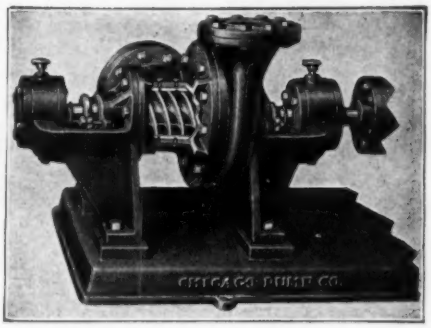
FOR INCREASING TREATMENT EFFICIENCY and SAVING LABOR



Wide Band Air Diffusion System with Swing Diffusers combine improved treatment efficiency and accessibility to diffuser tubes.



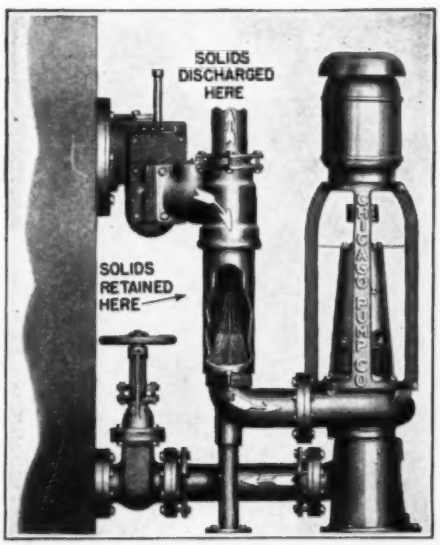
Comminutors eliminate screening nuisance, and pump clogging. Easily adapted to any type and size of sewage plant or pumping station.



Scru-Peller, centrifugal, cutting screw-feed pump, handles dense sludge without clogging. Eliminates filthiness of ordinary sludge pumps.

COMMINUTORS eliminate screening nuisance in sewage plants by screening and cutting sewage solids under water — No handling — No disposal — Prevent pump clogging by cutting up sewage solids before they are handled by the pumps — Easily adapted to existing installations—Over 1200 installed.

WIDE BAND AIR DIFFUSION SYSTEM with Swing Diffusers affords maximum operating efficiency and requires minimum labor for diffuser cleaning, as compared with all other systems—Diffuser tubes accessible from tank walk — Adaptable to existing aeration tanks — Over 100 plants equipped.



Flush-Kleen Sewage Pumps are Clog-Proof because solids are retained in the strainer and flushed out through the discharge.

FLUSH-KLEEN Clog-Proof sewage Pumps eliminate labor required for cleaning clogged pumps — Solids do not pass through pump impeller — Over 3000 installed.

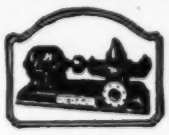
SCRU-PELLER centrifugal pump with cutting screw feed for dense sludge — Cannot clog — Eliminates filthiness, sticking valves, and hammering of ordinary sludge pumps — Over 600 installed.

CHICAGO PUMP COMPANY

SEWAGE EQUIPMENT DIVISION

2349 WOLFRAM STREET — **CHICAGO 18, ILLINOIS**

Flush-Kleen, Scru-Peller, Plunger, Horizontal and Vertical Non-Clogs, Water Seal Pumping Units, Samplers.



Swing Diffusers, Stationary Diffusers, Mechanical Aerators, Combination Aerator-Clarifiers, Comminutors.

CARTER

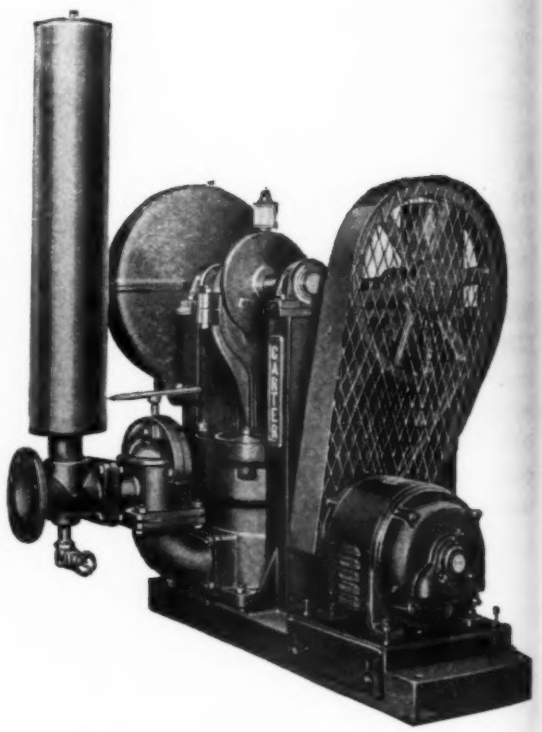
SLUDGE PUMPS

Send for BULLETIN NO. 4502

HAVE *the ability to handle over eight hundred times their weight in sludge* during a continuous pumping period of twenty-four hours. Astounding?—definitely. Actually our larger models can do more than this, for this pumping ability is accomplished with one of our smaller Model 800 Simplex units illustrated at right.

To meet such demanding requirements, the CARTER policy of fabrication from the finest of materials and assembly with precision care must be followed.

Every CARTER pumping unit shipped from our factory has been built by a group of skilled craftsmen with years of experience in the pump field. This ability, together with the exclusive features of self-aligning bearings, babbitt lined eccentrics, renewable valve seats and heavy duty pump shafting with one piece cast connecting rods found only in CARTER plunger sludge pumps guarantee you the maximum in efficient trouble-free sludge movement.



RALPH B. CARTER COMPANY

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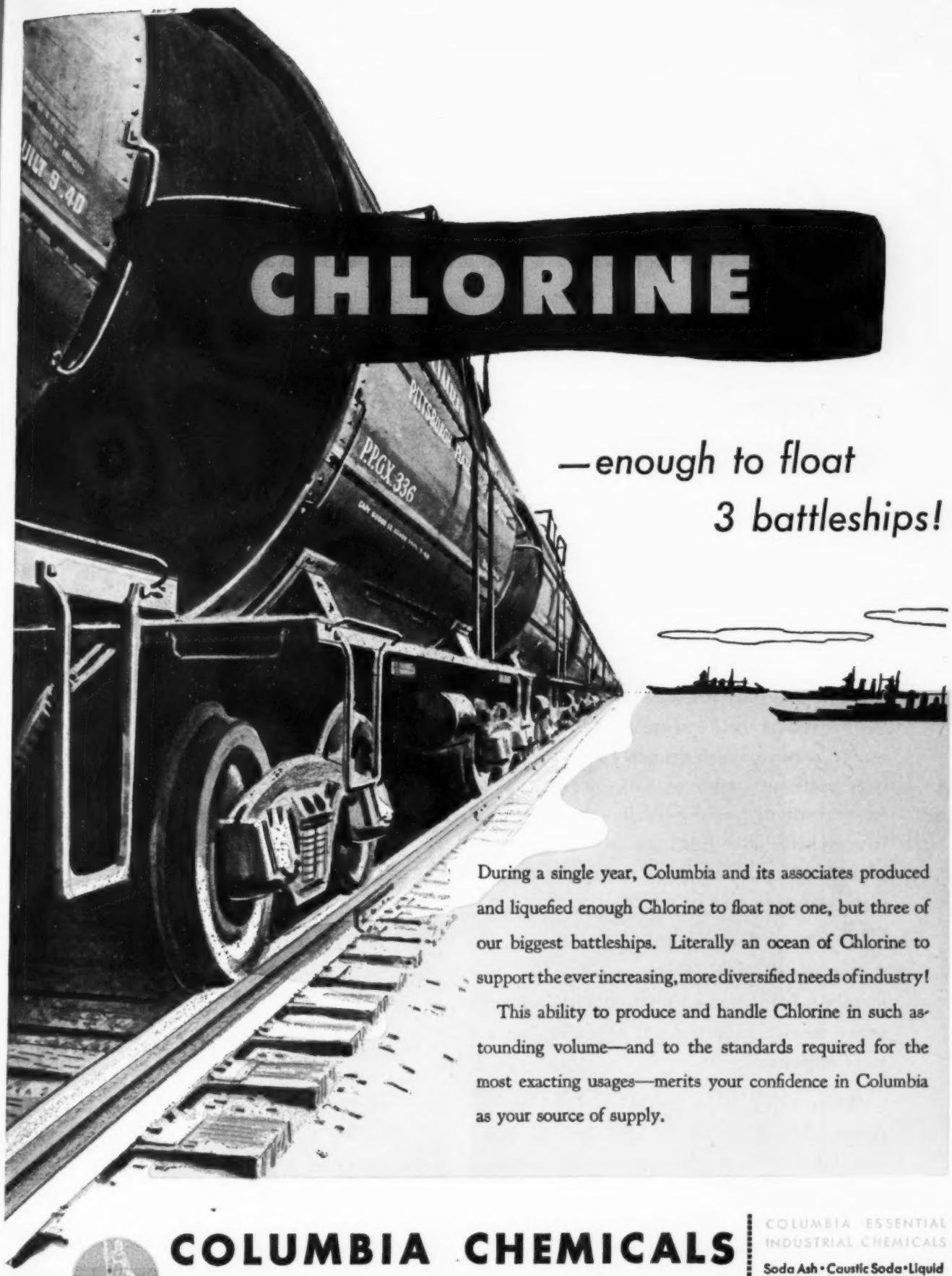
OUR BULLETIN GIVES COMPLETE DETAILS—WRITE FOR IT TODAY.



During a single year, Columbia and its associates produced and liquefied enough Chlorine to float not one, but three of our biggest battleships. Literally an ocean of Chlorine to support the ever increasing, more diversified needs of industry!

This ability to produce and handle Chlorine in such astounding volume—and to the standards required for the most exacting usages—merits your confidence in Columbia as your source of supply.

COLUMBIA CHEMICALS

PITTSBURGH PLATE GLASS COMPANY • COLUMBIA CHEMICAL DIVISION

GRANT BUILDING, PITTSBURGH 19, PENNSYLVANIA • Chicago • Boston • St. Louis • Pittsburgh
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COLUMBIA ESSENTIAL INDUSTRIAL CHEMICALS

Soda Ash • Caustic Soda • Liquid Chlorine • Sodium Bicarbonate • Pittchlor • Silene EF (Hydrated Calcium Silicate) • Calcium Chloride • Soda Briquettes • Modified Sodas • Caustic Ash • Phosflake • Calcene T (Precipitated Calcium Carbonate)

NO OTHER PIPE MATERIAL MEETS ALL THESE REQUIREMENTS

The one and only pressure pipe material that has proved its ability to meet all these requirements: service under ground for all pressures (any soil* or depth of fill)—service under water (salt or fresh)—service above ground (over a salt marsh, for instance)—service in a plant (water purification or sewage treatment)—is *good gray iron* of which cast iron pipe is made.

Because of its all-purpose adaptability, our members furnish cast iron pipe with joints for every service requirement, as shown on the page opposite.

What other pipe material offers you a comparable combination of long life, beam strength and impact strength, high resistance to internal and external pressure? Echo answers—none!

Cast iron pipe offers you, among other advantages—

(1) *A Century or more of useful life as a structure.* (The *proved* useful life of cast iron pipe is more than double the *estimated* life of other pressure pipe materials, under normal conditions.)

(2) *A Century or more of high capacity as a carrier.* (In locations where tuberculating waters are encountered, cement-lined cast iron pipe assures high carrying capacity for the life of the pipe.)

Does any other pressure pipe material offer you all the advantages of cast iron? Echo answers—no! Cast Iron Pipe Research Association, T. F. Wolfe, Research Engineer, Peoples Gas Bldg., Chicago 3.

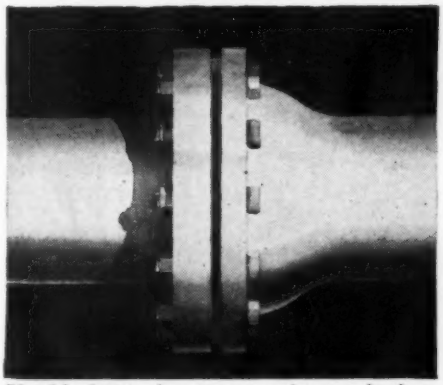
**For "super-hot" soils cast iron pipe is furnished with protective coatings.*

CAST IRON PIPE

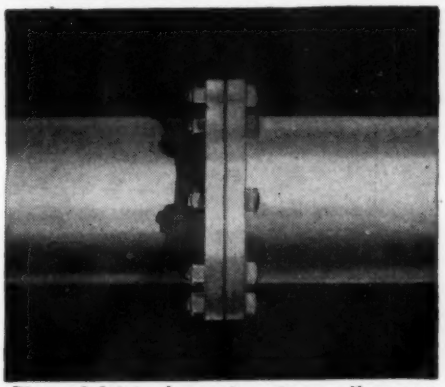
A JOINT FOR EVERY SERVICE NEED

Bell-and-spigot Joint—the time-tried and standard for water, gas and sewerage service.

Mechanical Joint—now standardized with interchangeable parts—for all pressures.



Flexible Joint—for river crossings and other sub-aqueous installations.

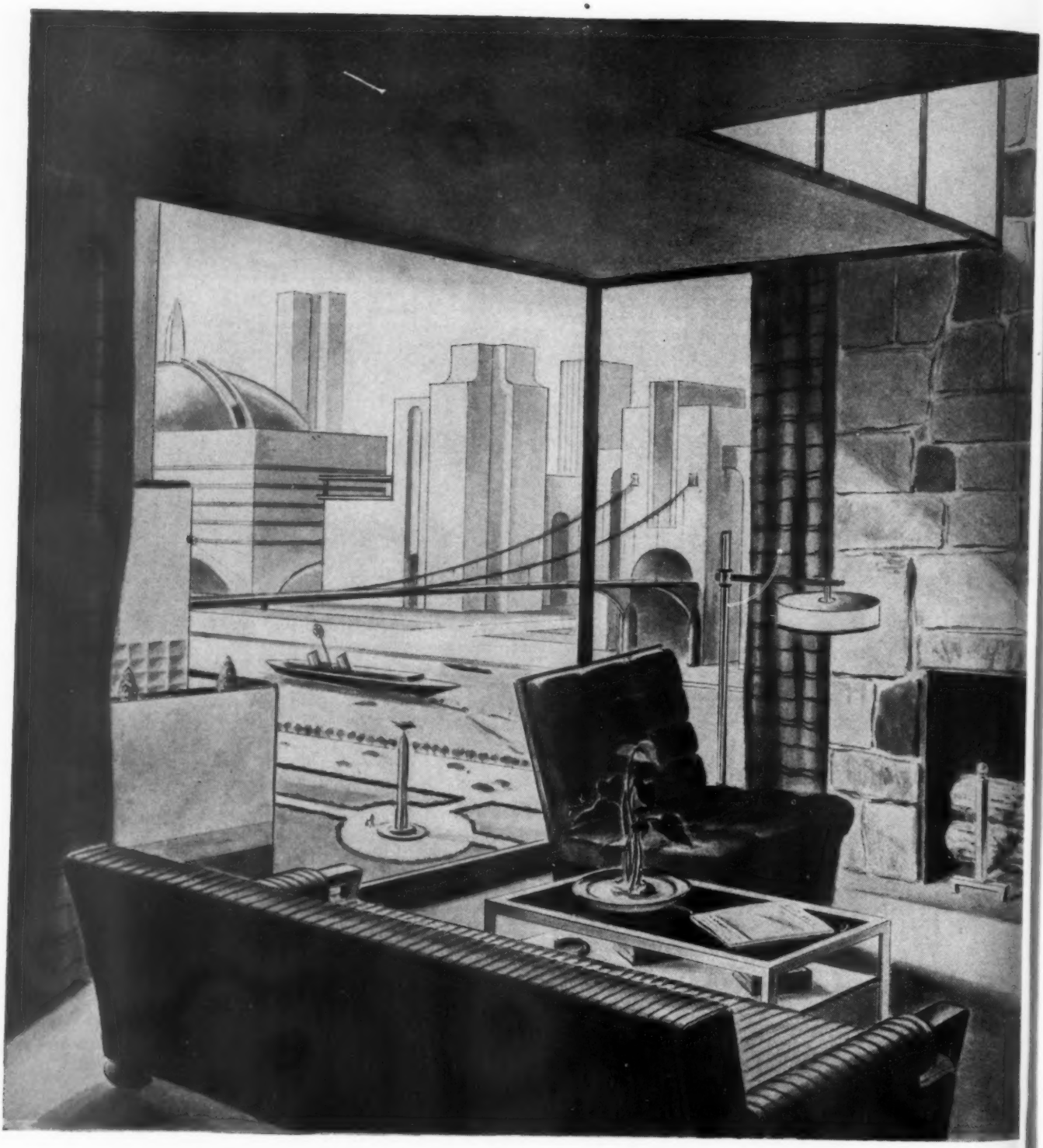


Flanged Joint—for water, steam, oil or gas lines generally used above ground.

Other joints are available for special purposes

Serves for Centuries

What will the city of tomorrow be like "behind the scenes"?



SPECTACULAR changes that will make for better living are definitely on the way.

Housing, transportation systems, street lighting—the whole scene of home and community life will be more efficient. More convenient. More beautiful. Even now, plans for such improvements are afoot in many centers.

But will there be corresponding improvements "behind the scenes"? In, for example, *sanitation?*

We believe there will be. For you and other experts in the field of sanitation have always been in the vanguard of civilization's crusade for cleaner, more healthful, more comfortable living conditions. Thanks to your work, such deadly diseases as typhoid have been practically eliminated. It is a foregone conclusion that you will continue to make vital contributions to the well-being of your community.

Already there are signs of a coming advance in sanitary engineering practice—an advance in which you will play an increasingly important role. We mean: *the removal of fresh food waste through existing sewer systems.*

This, the most revolutionary improvement in waste disposal service conceived since human wastes were first combined with drainage, is no mere vision. It is a practical "behind-the-scenes" plan, successfully tested in many communities where homes have been equipped with the General Electric Disposall.

By shredding fresh food waste into fine particles and flushing it into the sewer system, the Disposall eliminates garbage cans. *Yet it does not affect present sewage works practices.*

QUESTIONS AND ANSWERS ABOUT THE NEW TREND IN FOOD-WASTE REMOVAL METHODS

1. Is there an urgent need for improving present methods?

Yes. The instantaneous removal of food wastes is highly desirable as a health-protective measure.

Just as indoor plumbing replaced the unsanitary outhouse, so the Disposall should replace the unsanitary garbage can. Both outhouse and garbage can are odorous, putrefactive, and dangerous sources of disease. Both attract flies. And flies are known to carry many virulent germs and are suspected of carrying others, including "polio."

So food waste should be removed *immediately!*

2. How does the G-E Disposall work?

Installed in the kitchen sink, the Disposall shreds fresh food waste into particles small enough to be easily flushed into and carried by the sewer system. This simple treatment is all that is needed for the safe, instantaneous removal of food waste.

3. Aren't sewage solids and food wastes different in character?

Sanitary science has demonstrated that food waste and human waste are very similar. Both are organic, high in moisture content. Both are readily water-borne. Both act alike in settling, aeration, and sludge disposal processes.

4. Will Disposall food wastes have harmful effects on sewerage systems?

No. Solids shredded by the Disposall are light and "fluffy." They do not shoal or settle in sewer lines. Will not interfere with normal operation of treatment plants.

Actually these wastes are more readily removed than ordinary sewage solids, which include unground food wastes, flowing through your sewerage system now.

5. Won't your sewer lines be overtaxed?

No. It takes less than one gallon per person per day to flush out fresh food wastes with the Disposall.

Even if every home in your community had a Disposall—a situation which will not develop for many years—the increase in sewage flow volume would be only about 1%! Furthermore, it will take years of Disposall use to markedly affect the loading in your sewage treatment plant.

6. How has the Disposall been tested?

By exhaustive testing-station experiments and practical experience over a period of ten years in over 300 communities. All this has provided conclusive data on the efficiency of the Disposall and its effects on sewer systems and sewage treatment plants.

7. Is further information available?

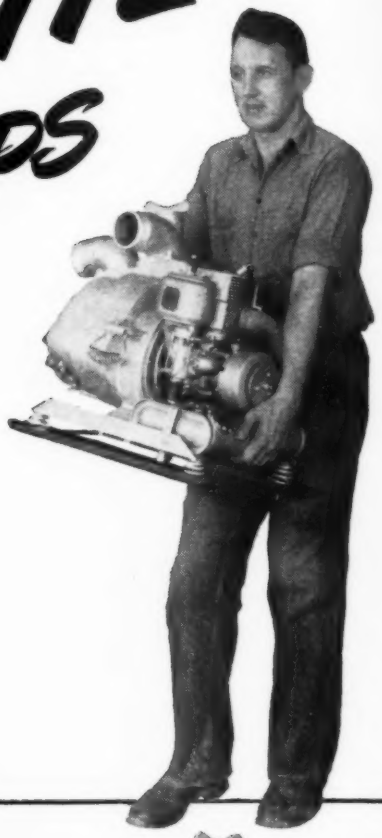
Yes! We believe you will be keenly interested in securing more details on this important trend in sanitation. For complete data, please write to Department WWS246, General Electric Company, Bridgeport, Conn.

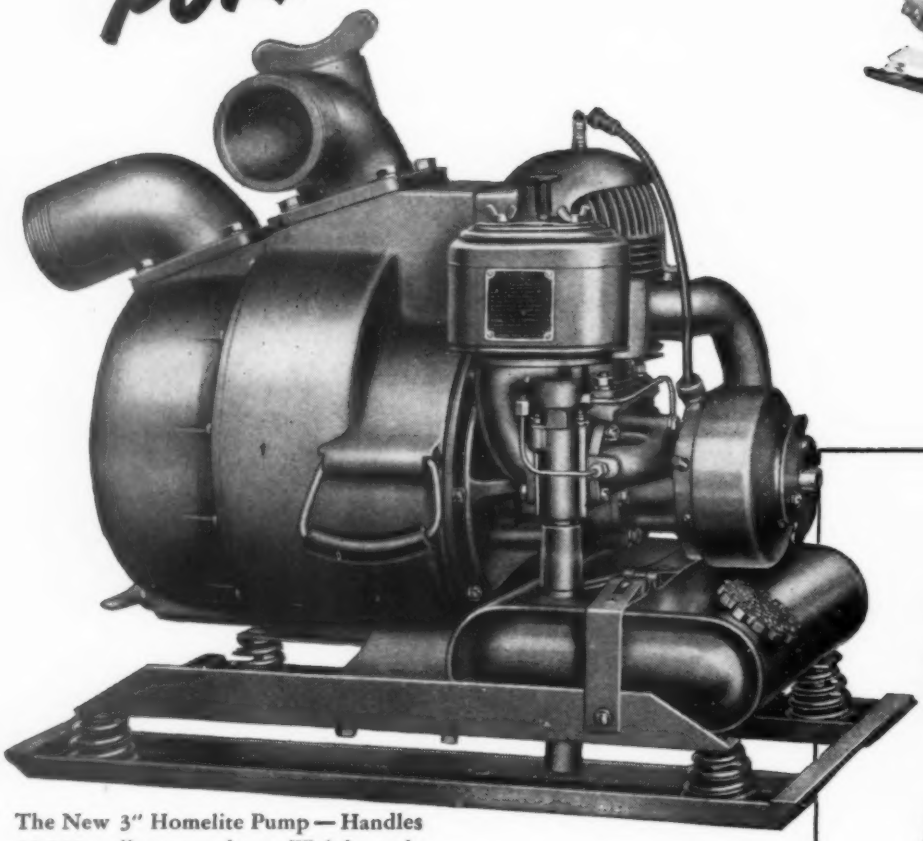
CONVERTS FOOD WASTE TO SEWAGE—ELIMINATES "GARBAGE"

GE Disposall
REG. U. S. PAT. OFF.

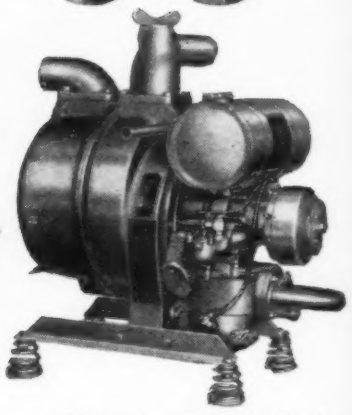
GENERAL ELECTRIC

Announcing... The New HOMELITE PORTABLE PUMPS

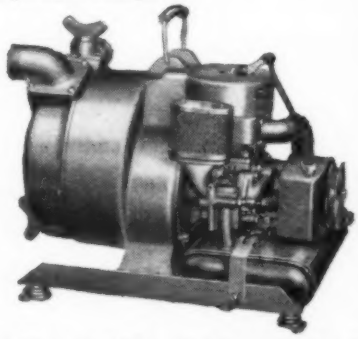




The New 3" Homelite Pump — Handles 15,000 gallons per hour. Weighs only 95 pounds complete.



The new 2" Homelite Pump — Handles 10,000 gallons per hour. Weighs only 88 pounds complete.



The New 1½" Homelite Pump—Handles 3,500 gallons per hour. Weighs only 48 pounds complete.

- **FASTER PRIMING**
- **FASTER PUMPING**
- **COMPLETELY PORTABLE**
- **BUILT-IN GASOLINE ENGINE**

Send for New Homelite Bulletin

HOMELITE

Portable **CORPORATION**

PUMPS • GENERATORS • BLOWERS

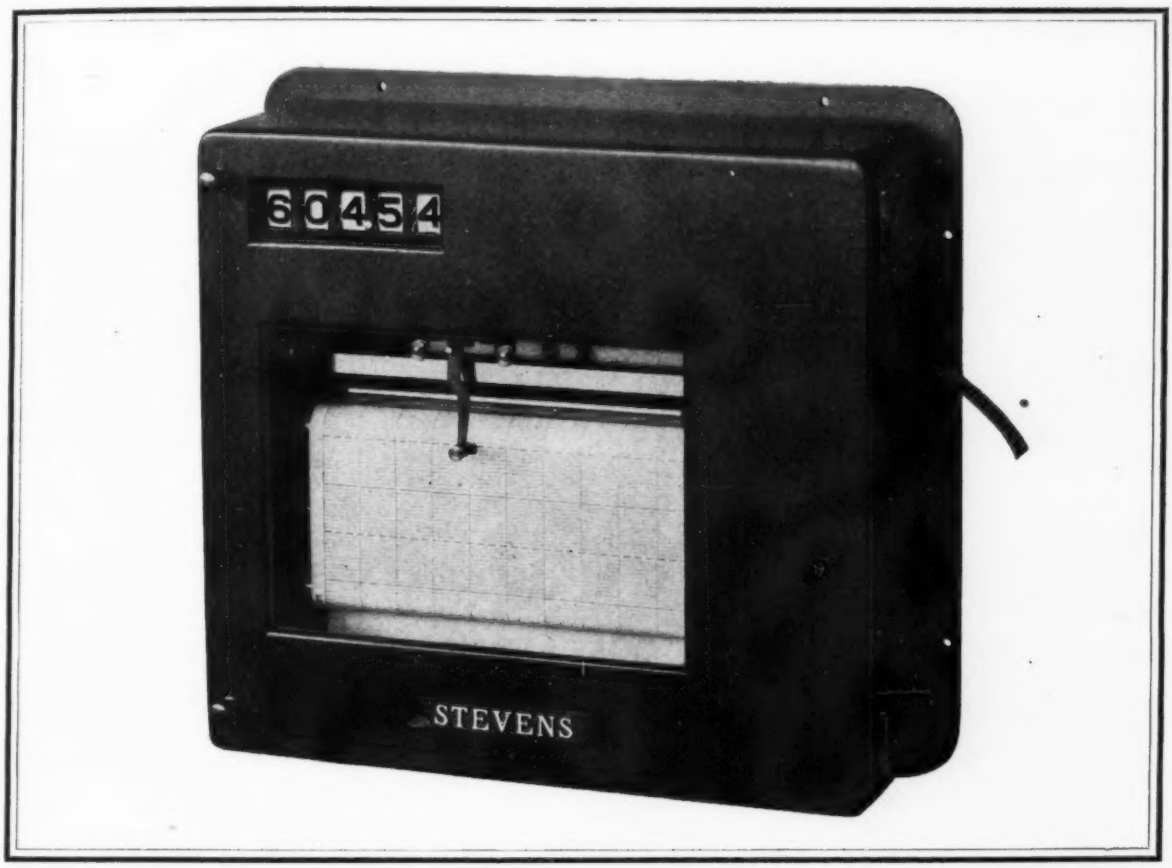
PORT CHESTER, NEW YORK, U.S.A.

STEVENS POSITION RECORDER

for Remote Registration

TYPE PAV qualifies for a multitude of uses—recording and indicating water levels, gate positions, valve openings, heads on turbines and pumps, or the remote registration of the position of any moving element.

Built for vertical mounting on wall or panel, the Type PAV is similar in principle to the Stevens Type A35 Recorder with a position motor substituted for the float pulley, thus converting the instrument into a remote registering recorder.



Type PAV

Pen is actuated by a distant position motor transmitter. Quality electric clock is standard equipment. Strip charts are available in 25-yard rolls for either English or metric units.

This versatile remote registration recorder is fully illustrated and described in Bulletin P15. Write for your copy.

LEUPOLD & STEVENS INSTRUMENTS

MANUFACTURERS SINCE 1907

PORTLAND 13, OREGON

Hydrographic, Surveying, Navigation, Automatic Controls

Leupold & Stevens Instruments
4445 N. E. Glisan St., Portland 13, Oregon
Please send Bulletin No. P15 on the Stevens *Type* PAV Recorder.

Name _____

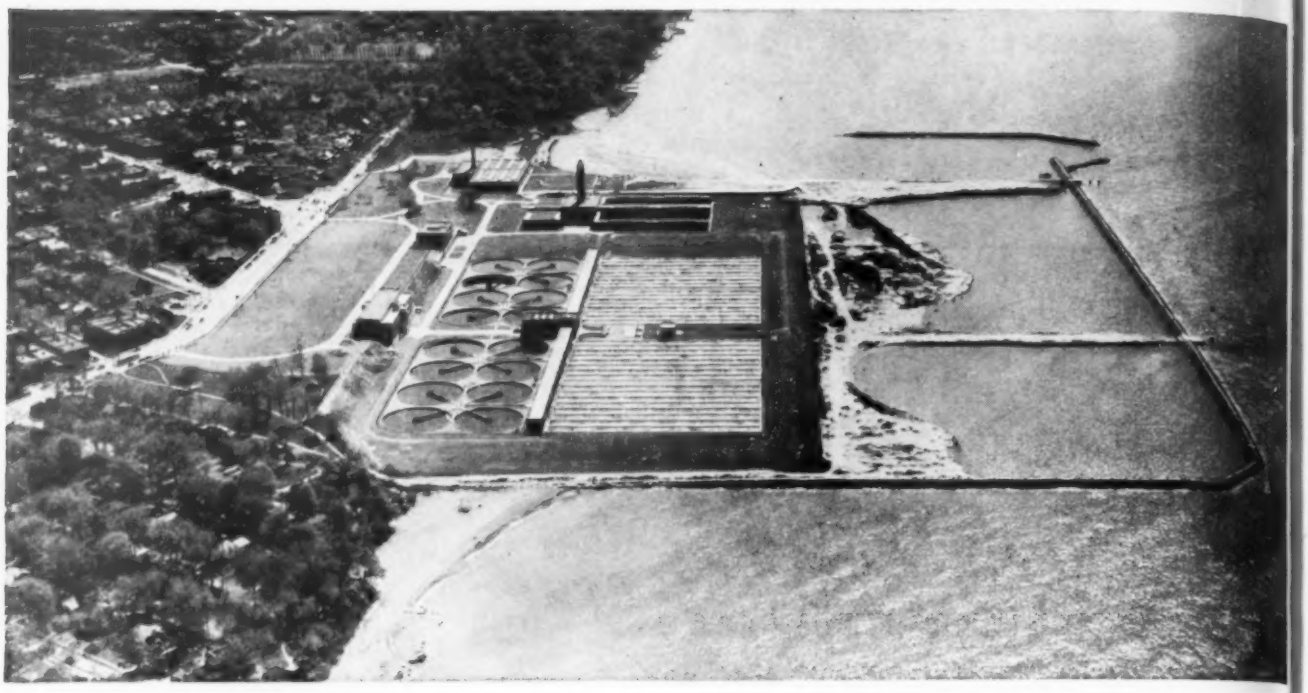
Organization _____

Title _____

Street _____

City _____ *Zone* *State* _____

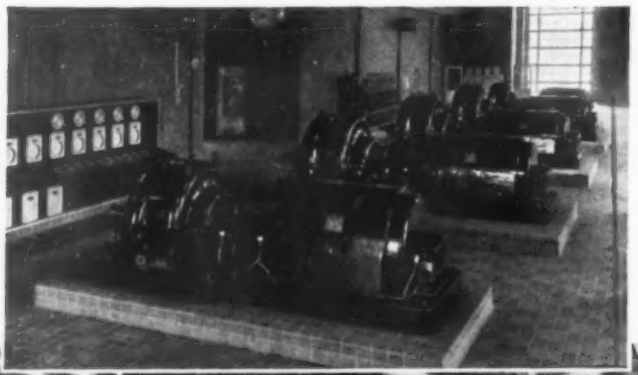
Cleveland's Modern Sewage Disposal Plant

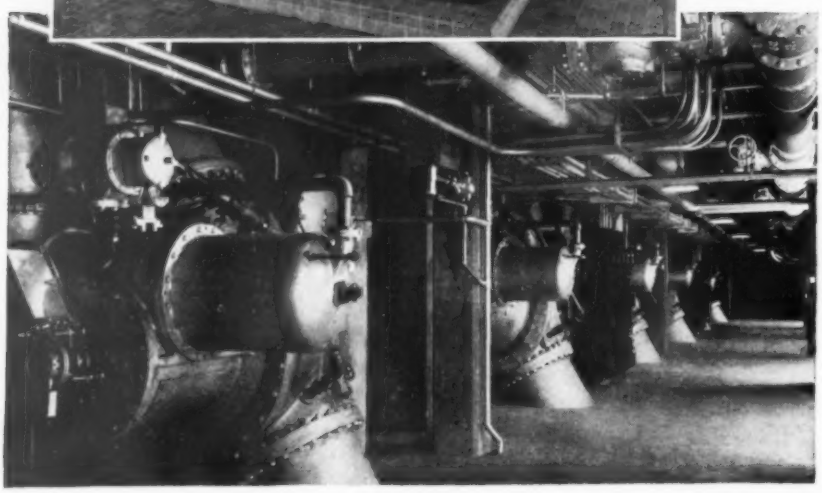


Is Equipped with

ROTOVALVES

by S. MORGAN SMITH COMPANY for Compressor Check Service





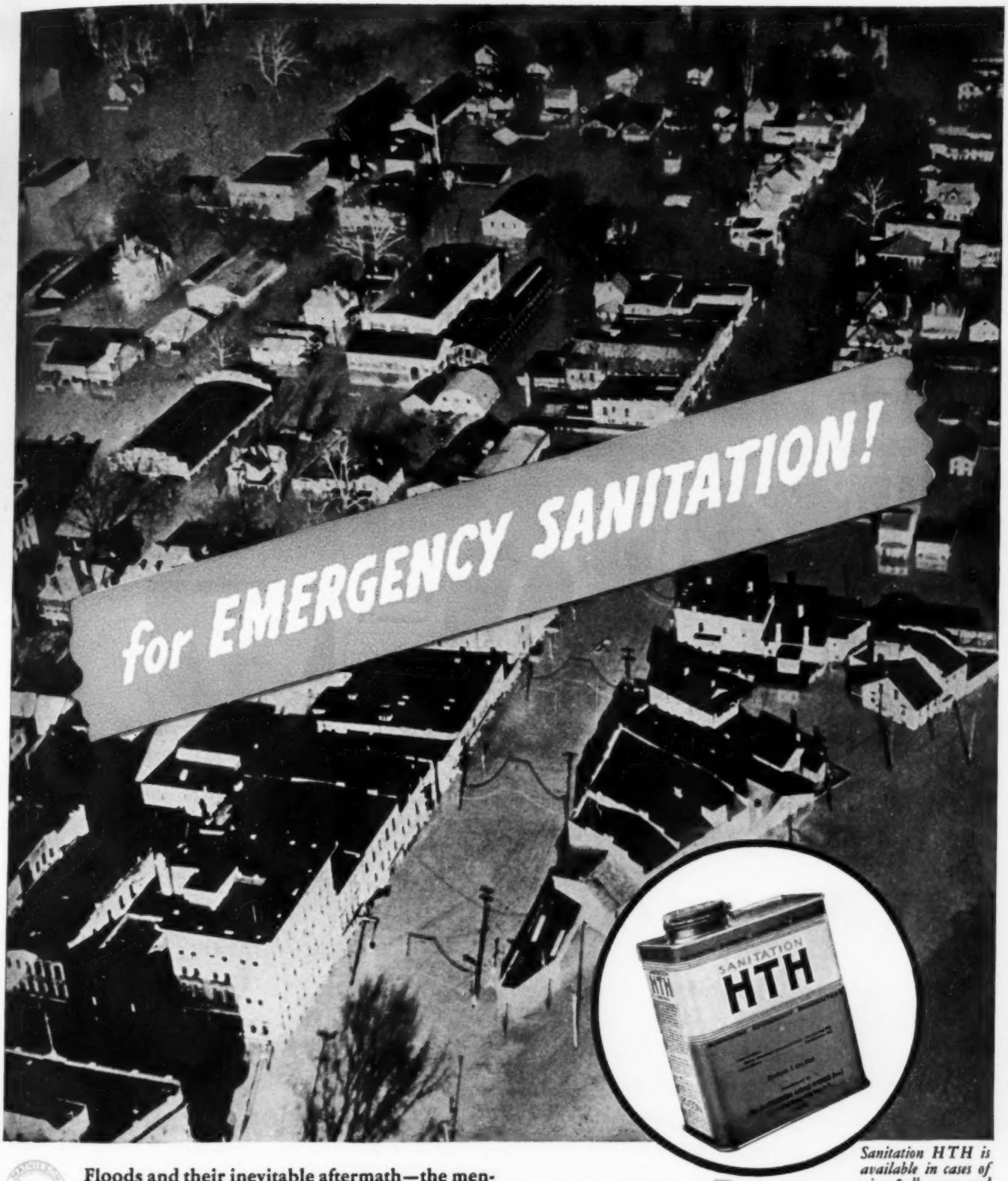
PROTECTING the motor driven centrifugal blowers, shown at the left, are 3—36″ and 2—30″ Air Check Rotovalves, at the EASTERLY SEWAGE WORKS pictured above, which are operated by pneumatic cylinders deriving air from the line at 7½ pounds pressure.

The selection of Rotovalves was made after searching analysis, and constitutes a tribute to their performance and dependability!

If in need of information covering similar operating problems and applications write us for details.

S. MORGAN
SMITH
COMPANY

YORK
PA.



Sanitation HTH is available in cases of nine 5-lb. cans and in 100-lb. drums.

Floods and their inevitable aftermath—the menace of epidemic water-borne disease—call for quick and effective action. Countless communities stricken by flood waters know how Mathieson's Sanitation HTH affords prompt chlorination of polluted water supplies—prevents the scourge of disease and makes possible early resumption of safe water service.

Flood threatened communities should maintain adequate stocks of Sanitation HTH to secure the protection its 70% available chlorine provides in meeting flood and other emergency conditions. Check your stock now—and write or wire for an additional supply of Sanitation HTH if required.

Mathieson
CHEMICALS

THE MATHIESON ALKALI WORKS (INC.)

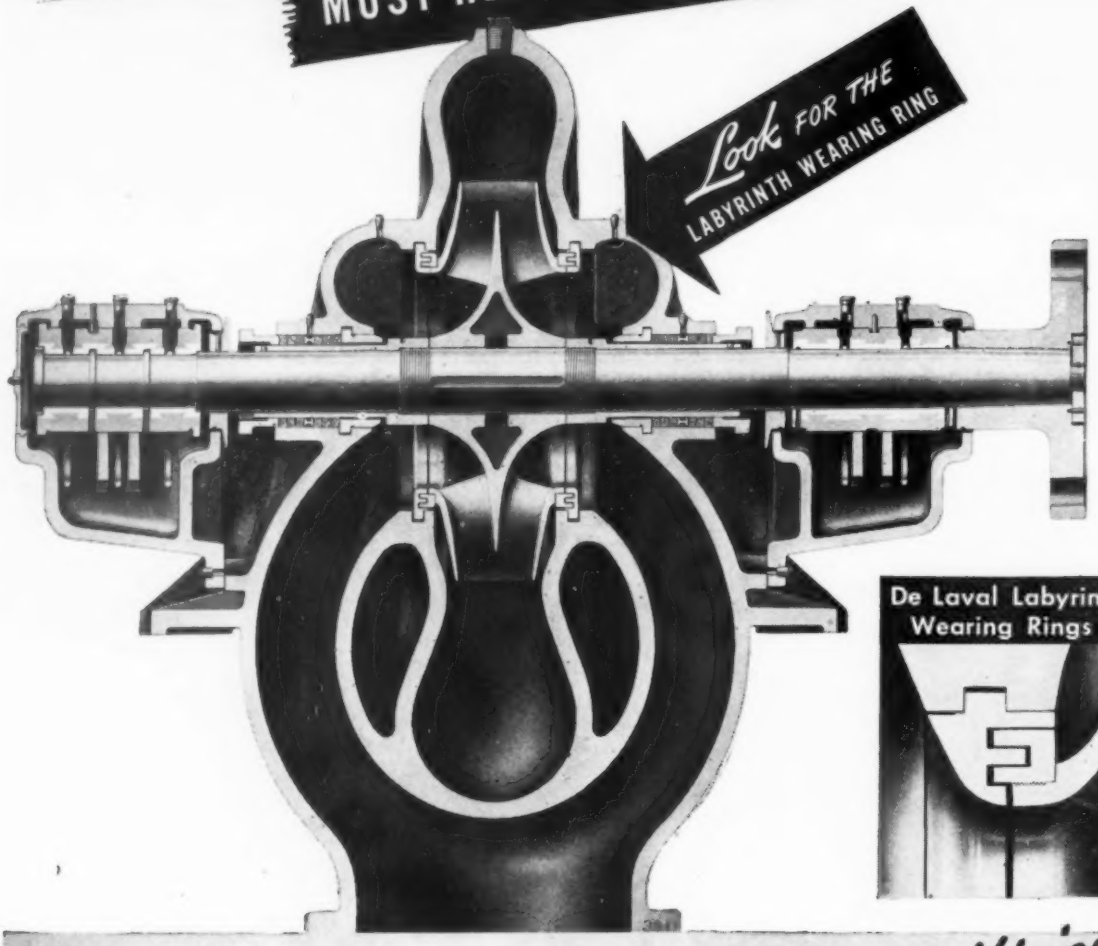
60 East 42nd Street, New York 17, N. Y.

SANITATION HTH ... LIQUID CHLORINE ... PH-PLUS ... FUSED ALKALI ... CAUSTIC SODA ... SODA ASH ... BICARBONATE OF SODA ... CHLORINE DIOXIDE AMMONIA, ANHYDROUS & AQUA ... DRY ICE ... CARBONIC GAS ... SYNTHETIC SALT CAKE ... SODIUM CHLORITE PRODUCTS ... SODIUM METHYLATE

THE PUMP YOU BUY *TODAY*

MUST HELP MEET COMPETITION *TOMORROW*

Look FOR THE LABYRINTH WEARING RING



DE LAVAL LABYRINTH RINGS *keep efficiency UP cost DOWN*

De Laval Labyrinth Wearing Rings minimize leakage from discharge back to suction. The sealing action of these rings is accomplished by the use of large clearance, tortuous labyrinth passages and does not depend upon close mechanical clearances, such as required for plain flat rings. Because of the larger clearances and reduced flow, the effectiveness of the De Laval labyrinth ring is but little diminished by wear, resulting in sustained efficiency for long periods. When selecting pumps for lowest ultimate cost, look for the De Laval Labyrinth Wearing Ring.

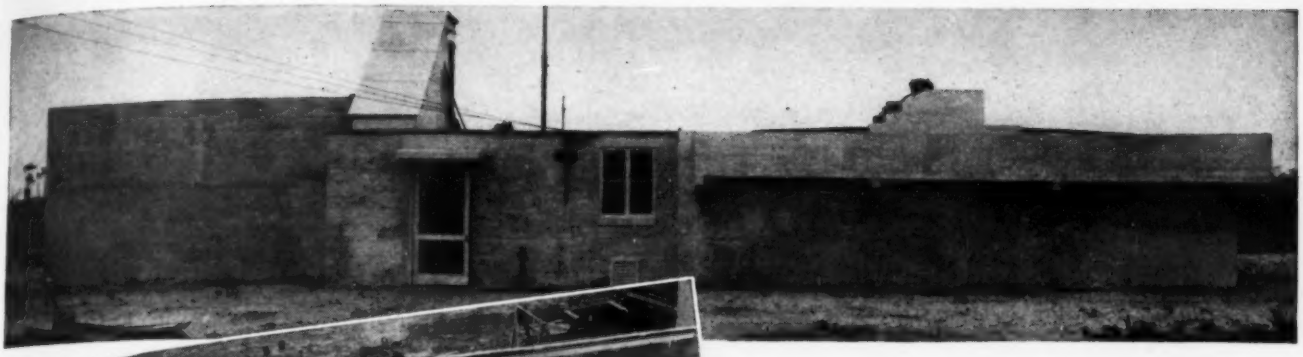
3237

TURBINES • HELICAL GEARS
WORM GEAR SPEED REDUCERS
CENTRIFUGAL PUMPS • CENTRIFUGAL BLOWERS and COMPRESSORS • IMO OIL PUMPS

DE LAVAL

STEAM TURBINE COMPANY · TRENTON 2, NEW JERSEY

SALES OFFICES: ATLANTA • BOSTON • CHARLOTTE • CHICAGO • CLEVELAND • DENVER DETROIT • HELENA • HONOLULU • HOUSTON KANSAS CITY • LOS ANGELES • MANILA MONTREAL • NEW HAVEN • NEW ORLEANS NEW YORK • PHILADELPHIA • PITTSBURGH ROCHESTER • ST. PAUL • SALT LAKE CITY • SAN FRANCISCO • SEATTLE • TORONTO • TULSA VANCOUVER • WASHINGTON, D.C. • WINNIPEG And Cities in Central and South America



"Exceptionally good results"

AT GULF SHORES, FLORIDA, "Aerifier" TREATMENT PLANT

INITIAL OPERATION TEST OF THIS ALL-YEOMANS PACKAGE PLANT MAKES NEWS—

FIVE-DAY B. O. D. 97% REMOVAL

SUSPENDED SOLIDS 98% REMOVAL

UNDIVIDED RESPONSIBILITY

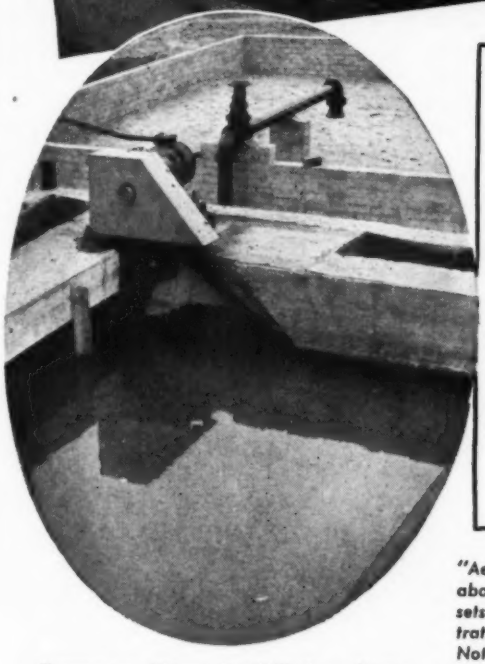
Pronounced "exceptional" and easily exceeding the Yeomans guarantee, this all-Yeomans installation serves a community housing shipyard workers from nearby Panama City.

Heart of the plant is the Yeomans "Aerifier" unit with the Spiralflo aerator, long since distinguished for extraordinary efficiency in the aeration of sewage—and at low power cost. The "Aerifier" combines the processes of aeration and final clarification in one concrete tank.

There are no flies, no odors at this plant, and the all-concrete tank construction means there will be no scraping or painting of steel tanks and baffles to prevent rust and collapse. Nor is a waste sludge hopper required.

Bulletin 6650 gives a complete description of the "Aerifier." Send the coupon for complete information.

Consulting engineers retained by owner for sewerage facilities and sewage treatment plant—Smith and Gillespie, Jacksonville, Florida. Contractor—Paul Smith Construction Company, Tallahassee, Florida.



Yeomans new "Streamline" Sludge collector for rectangular settling tanks is in operation at Gulf Shores. This unit is 20 feet long by 8 feet wide with 7 foot side water depth and is functioning in the primary settling tank.

AN ALL-YEOMANS PLANT

AERIFIER—No. 50 "SPIRALFLO" AERATOR—combines aeration and final settling in one concrete tank.

SLUDGE COLLECTOR—new Yeomans "Streamline" design; 20 ft. long, 8 ft. wide, 7 ft. water depth.

SLUDGE PUMP—YEOMANS No. B1100—40 g.p.m. to 15 ft. T. D. H.

SEWAGE PUMPS AT LIFT STATION—two Yeomans No. 4M3, 100 g.p.m. to 48 ft. T. D. H.

"Aerifier" in operation is viewed from above. The "Spiralflo" aeration cone sets up a spiral movement that penetrates throughout the entire tank. Note the loading funnel which loads the mixed liquor for transfer to the corner settling compartments. The latter can be seen in the lower left and right corners and their quiescent condition assures thorough settling.

Yeomans Brothers Company

1423 NORTH DAYTON STREET
CHICAGO 22, ILLINOIS

YEOMANS PUMPS • GIVE YEOMAN SERVICE •

Please send Bulletin 6650 describing Yeomans Aerifier.

Name_____

Address_____

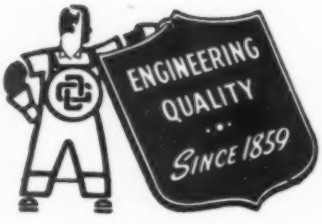
Company_____

We Joined Pump and Motor to Save You *Time and Trouble*

In Gardner-Denver Close-Coupled Centrifugal Pumps, pump and motor are combined in a complete, compact unit, entirely assembled and ready for service. Gardner-Denver Close-Coupled Centrifugals can be installed in any position—on the floor, on the wall or on the ceiling, either horizontally or vertically!

The higher efficiency of these Gardner-Denver Centrifugals starts in the foundry, where rigidly controlled practices assure smooth inside surfaces. Water passages and impeller blades are carefully proportioned to produce the most efficient operation over a broad working range.

For full information write Gardner-Denver Company, Quincy, Illinois.



GARDNER-DENVER
Since 1859

Gardner-Denver Close-Coupled Centrifugals are available in sizes to handle from 5 to 1200 g.p.m. against heads of from 10 to 300 feet.

...FOR TODAY

As Johnny and his buddies come marching home, it's up to every community to have plenty of big jobs for their own men to do. One sound way to insure the future of your local citizens is to plan important public works projects NOW—projects which will give your men the steady employment they'll need during the period of "war-to-peace conversion."

The manufacture and installation of Lock Joint Concrete Pipe for your water supply lines, sewerage and drainage programs provide one of the best methods for putting your local men to work quickly—right in your own home town. Past experiences have proven that by erecting temporary local plants as much as 90% of your local labor can be used in building these dependable and economical pipelines. In addition, the Lock Joint Pipe Company buys the bulk of supplies and materials from your own merchants—and thus, most of the cost of the project remains in your community.

Whether your project is large or small, for the present or the future, your 'phone call, telegram, cable or letter to any of our offices will bring a prompt reply.

LOCK JOINT
Reinforced Concrete
PRESSURE PIPE

LOCK JOINT PIPE COMPANY

Established 1905

P. O. BOX 269, EAST ORANGE, N. J.

Denver, Colo. • Chicago, Ill. • Kenilworth, N. J. • Kansas City, Mo. • Rock Island, Ill.
Joplin, Mo. • Valley Park, Mo. • Cleveland, Ohio • Hartford, Conn. • Navarre, Ohio

SCOPE OF SERVICES *Lock Joint Pipe Company specializes in the manufacture and installation of Reinforced Concrete Pressure Pipe for Water Supply and Distribution Mains in a wide range of diameters as well as Concrete Pipe of all types for Sanitary Sewers, Storm Drains, Culverts and Subaqueous Lines.*

HERE ARE THE BASIC MATERIALS YOU NEED... NOW!

GOVERNMENT-OWNED WAR SURPLUS

Chemicals

SPECIAL NAPALM THICKENER

Mixture of Oleic, Napthenic, and Cocoanut Fatty Acids, representing a metallic soap compound. 971,850 lbs., Denver, Colorado. 216,200 lbs., Birmingham, Alabama. Packed in drums, price $.10 per lb. in carload lots and $.12 per lb. l.c.l.

One of the most important of the Surplus Disposal jobs assigned to the War Assets Corporation, a subsidiary of RFC, is the selling . . . *now* . . . of a large and varied stock of Surplus Chemicals. These chemicals represent a tremendous Government investment, but *they are priced for quick sale and represent real values to industrial users!*

Because of space limitations, only a few of the major items are offered in this advertisement. If you are interested in any of the items offered here, write, wire or telephone the RFC Agency Office listed below, where the stock is located. Act quickly! All items offered are F. O. B. Location. Credit terms may be arranged.

VETERANS: To help you exercise your priority, special veteran service facilities are now available at our offices.

CHECK THIS LIST FOR YOUR NEEDS

and have your name placed on our regular mailing list by mailing the attached coupon.

CHECK AND MAIL TODAY!

To War Assets Corporation:

Please send me further information on the following products:

- ☐ Glacial Acetic Acid, CP, 10,067 gallons in one-gallon bottles, San Francisco, Calif., price $1.00 per gal.
- ☐ Glacial Acetic Acid, CP, 1,416 gallons in one-gallon bottles, Portland, Oregon, price $1.00 per gal.
- ☐ Bakelite Rods and Sheets, large quantities, various sizes and dimensions, Phila., Pa.
- ☐ Copper Napthenate, 28,212 lbs., 8% solution, in drums, Cleveland, Ohio, price $.12 per lb.
- ☐ Copper Napthenate, 22,220 lbs., 8% solution, in drums, Nashville, Tennessee, price $.12 per lb.
- ☐ Copper Napthenate, 10,037 lbs., 8% solution, metal drums, Charlotte, N. Carolina, price $.12 per lb.
- ☐ Copper Napthenate, 6,613 lbs., 8% solution, in drums, Birmingham, Ala., price $.12 per lb.
- ☐ Sodium Sulphite, 492,000 lbs., 100-lb. bags, Nashville, Tenn., price $30.00 per ton.
- ☐ Manganous Chloride, 100 short tons, in bulk, Salt Lake City, Utah, price $50.00 per ton.

Firm .....

Street .....

City ..... State .....

(155-1)

Contact your nearest RFC Agency Office listed below for information, regarding *all* surplus materials. If your local RFC office does not have all the materials you need, it will endeavor to locate them from other offices throughout the country.

PAINTS

PROTEIN BINDER COLD WATER CAMOUFLAGE PAINT, TYPE I

Specification: ES-T-1093
Colors: Burnt Sienna, Burnt Umber, Deep Green, Blue, Chrome Oxide Green, Iron Oxide Red, Earth Red
Packed in 5 pound cartons
Richmond, Virginia
Price: 2¢ per pound

OLEORESINOUS (EMULSIFIABLE) CAMOUFLAGE PAINT
Specification: T-1279
Color: Olive Drab
Packed in 5 gallon containers
San Francisco, California
Price: 65¢ per gallon
Minimum sale: 200 gallons

OIL TYPE READY MIXED CAMOUFLAGE PAINT
Specification: T-1215
Colors: Olive Drab, Loam, Earth Brown, Field Drab, Earth Red, Dark Green
Packed mostly in 5 gallon containers
San Francisco, California
Price: 65¢ per gallon
Minimum sale: 200 gallons of any one color

CAMOUFLAGE LACQUER
Specification: M-485 & M-485 C. Colors: Light Gray & Blue Gray
Packed in 5 gallon containers
Philadelphia, Penna.
Price: 50¢ per gallon

LACQUER DOPE
Specification: 3-109-E
Color: Olive Drab
Packed in 30 gallon drums
Chicago, Illinois
Price: 50¢ per gallon

A DISPOSAL AGENCY DESIGNATED BY THE SURPLUS PROPERTY ADMINISTRATION for Surplus Producers' and Capital Goods, Aircraft and Plants formerly handled by Reconstruction Finance Corporation . . . and for Surplus Consumer Goods formerly handled by United States Department of Commerce.

WAR ASSETS CORPORATION

(A SUBSIDIARY OF RECONSTRUCTION FINANCE CORPORATION)

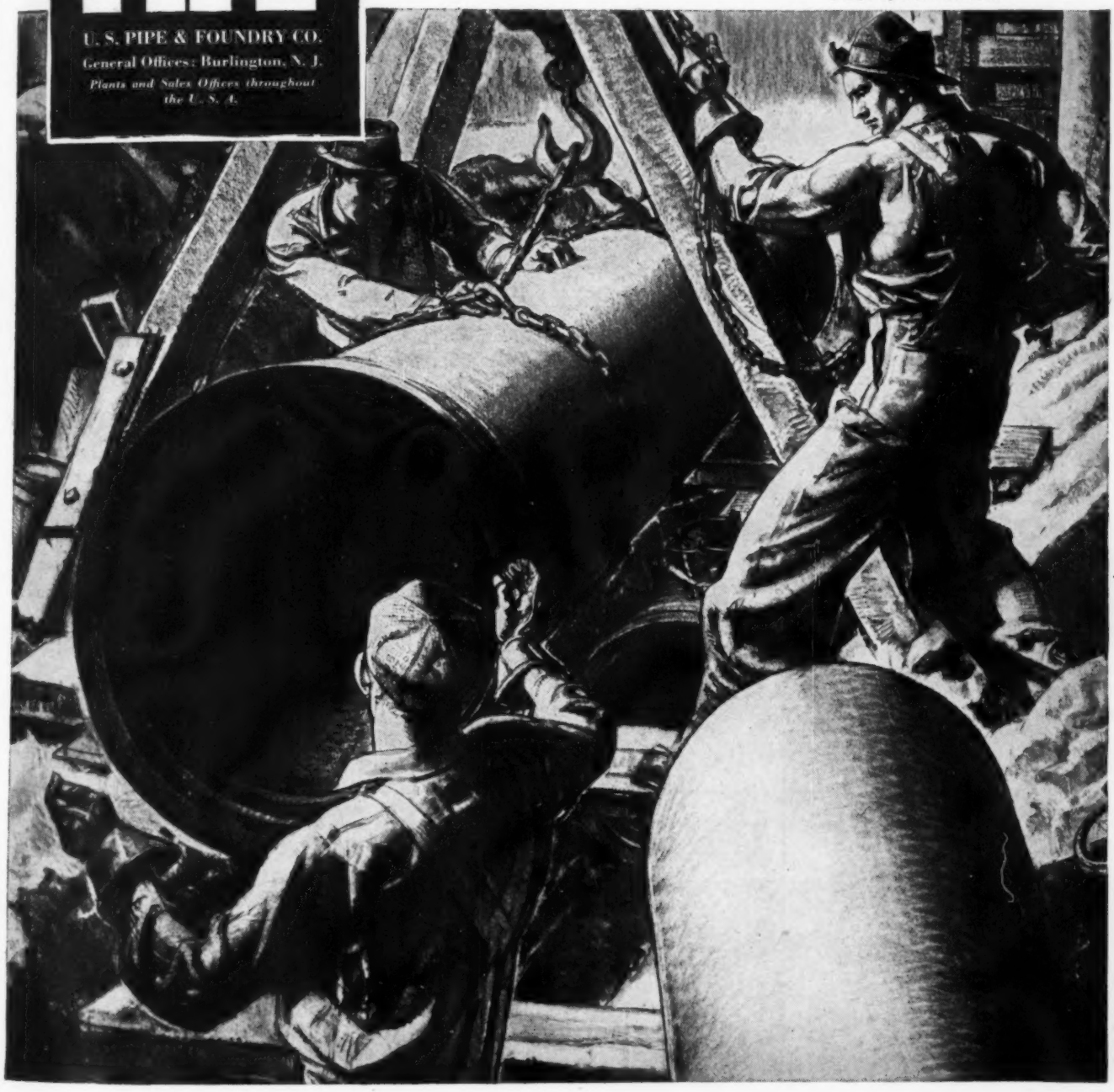
RFC OFFICES (INCLUDING FORMER DEPARTMENT OF COMMERCE REGIONAL SURPLUS PROPERTY OFFICES) LOCATED AT: Atlanta • Boston • Chicago • Denver • Kansas City, Mo. • New York • Philadelphia • San Francisco • Seattle • OTHER RFC SURPLUS PROPERTY OFFICES LOCATED AT: Birmingham • Charlotte • Cleveland • Dallas • Detroit • Helena • Houston • Jacksonville • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • Oklahoma City • Omaha • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • Spokane • OTHER FORMER DEPARTMENT OF COMMERCE REGIONAL SURPLUS PROPERTY OFFICES LOCATED AT: Cincinnati and Fort Worth

Long life and low annual maintenance cost provide the true index to economy in underground mains. With these factors assured, as in U. S. Cast Iron Pipe, a higher *first* cost is soon offset by *low cost per service year.* Ultimately, the difference in initial investment is paid for many times over in savings and service to the community. This is a matter of record, not conjecture, which can easily be verified by economy-minded officials.

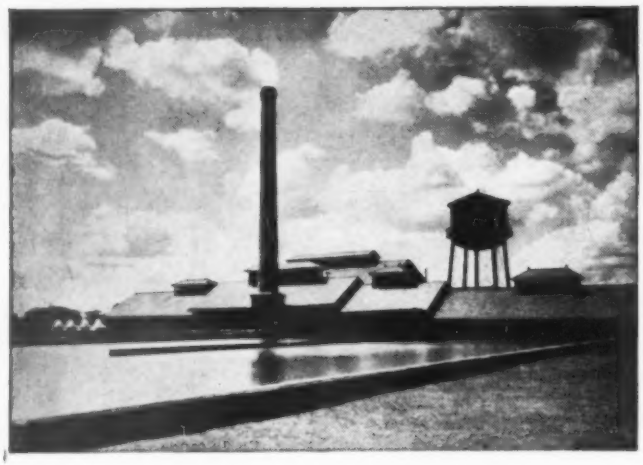
U.S. cast iron PIPE

U. S. PIPE & FOUNDRY CO.
General Offices: Burlington, N. J.
Plants and Sales Offices throughout the U. S. A.

Drawn by Dean Cornwell



GENERAL CHEMICAL "ALUM"
. . . EQUALLY EFFICIENT FOR COAGULATION OF *WATER and SEWAGE!*



Today, aluminum sulfate is almost universally accepted by water experts as the best coagulant for the removal of turbidity, color and bacteria from water . . . and General Chemical Aluminum Sulfate is the outstanding choice the nation over. The reason? Operating men have come to rely on its high quality and constant uniformity, knowing that the effectiveness of General Chemical Alum has been "proved in settling basins all over America."

Municipal officials in charge of sewage disposal find that clarity and purity of sewage effluent are also easily obtainable with General Chemical Aluminum Sulfate because of the many reasons noted below. Why not join the majority of American cities that prefer General Chemical Alum—and specify "General" for your requirements?

★ FOR WATER WORKS

1. Produces crystal-clear water.
2. Gives better floc formation resulting in longer filter runs.
3. It is a low-cost coagulant.
4. Has no chlorine demand, conserving chlorine exclusively for disinfection.
5. Superior in tests against other coagulants.
6. High in quality, its constant uniformity can be counted upon.
7. Aids in the reduction of tastes and odors.

★ FOR SEWAGE PLANTS

1. Clean, easy to handle, dry feeds well, and economical to use.
2. Simple application, requires only low cost feeding apparatus and minimum attention.
3. Clear, colorless effluents are possible.
4. Sludge digests readily.
5. Treated digested sludge dries quickly, with a minimum of odor.
6. Chlorine consumption is cut due to lower demand of clarified sewage.

BASIC CHEMICALS

GENERAL CHEMICAL COMPANY

FOR AMERICAN INDUSTRY

"Preferred by Most American Cities"

GENERAL CHEMICAL COMPANY

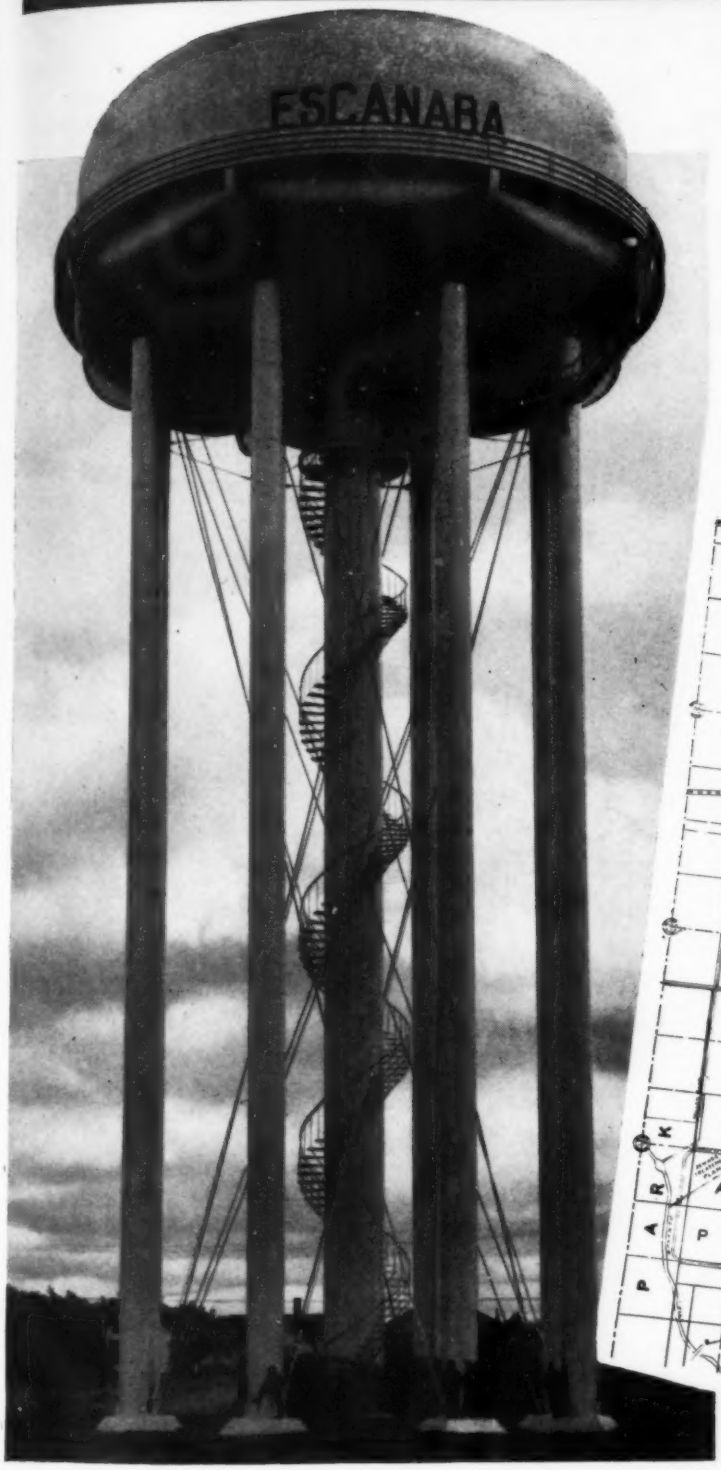
40 RECTOR STREET, NEW YORK 6, N. Y.

Sales and Technical Service Offices: Atlanta • Baltimore • Boston • Bridgeport (Conn.) Buffalo • Charlotte (N. C.) • Chicago • Cleveland • Denver • Detroit • Houston Kansas City • Los Angeles • Minneapolis • New York • Philadelphia • Pittsburgh Providence (R. I.) • San Francisco • Seattle • St. Louis • Utica (N. Y.) • Wenatchee & Yakima (Wash.)

In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.

In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

500,000-GALLON HORTON ELEVATED TANK



. . . will lower pumping costs at Escanaba, Mich., an estimated $2,500 per year

● Lower operating costs is only one of the many benefits derived from Horton elevated water storage. More uniform distribution pressure is another benefit that the 3,430 customers served by the water distribution system of Escanaba may expect through the use of this elevated water storage tank.

The map below shows the location of the Horton elevated storage tank, wells, hydrants and present mains.

CHICAGO BRIDGE & IRON COMPANY

Chicago 4 . . . . . 2198 McCormick Bldg.
New York 6 . . . . . 3390-165 Broadway Bldg.
Cleveland 15 . . . . . 2262 Guildhall Bldg.
Los Angeles 14 . . . . . 1455 Wm. Fox Bldg.
Birmingham 1 . . . . . 1586 North 50th Street
Atlanta 3 . . . . . 2181 Healey Bldg.
Plant in Birmingham, Chicago and Greenville, Pa.

Tulsa 3 . . . . . 1646 Hunt Bldg.
Houston 1 . . . . . 5615 Clinton Drive
Philadelphia 3 . . . . . 1644-1700 Walnut Street Bldg.
Washington 4 . . . . . 703 Atlantic Bldg.
San Francisco 11 . . . . . 1283-22 Battery St. Bldg.
Detroit 26 . . . . . 1551 Lafayette Bldg.
In Canada: Horton Steel Works, Limited, Fort Erie, Ont.

FROM HAND-BAGGAGE SIZE . . . ON UP!

GORMAN-RUPP PUMPS WILL FIT YOUR JOB

You may want a pump as small and easy to carry as a bag of tools - Gorman-Rupp has such a pump that will deliver as much as 3,000 gallons per hour. Or, you may have a heavy de-watering job that calls for as much as 125,000 gallons per hour at continuous operation. Whatever the size or application – get one of those dependable, Gorman-Rupp BLUE pumps!

If you want a self-priming, centrifugal pump that never has to be shut down to be cleaned out get a dependable Gorman-Rupp BLUE pump, which has no recirculation orifice to get plugged or control valve to get jammed.

For size, for weight, for power, for cost – Gorman-Rupp self-priming centrifugal pumps can't be matched! Our nearest distributor will send you one and let you be the judge. If it doesn't do a better pump job than any other you have seen, return it at our expense – and it won't cost you a cent!

GORMAN-RUPP PUMPS
ARMY NAVY
UNSURPASSED FOR PUMPING FAST

THE GORMAN-RUPP COMPANY

MANSFIELD · OHIO

You can START RIGHT HERE...

to count its money-saving advantages

BEGINNING at the moment its convenient 13-foot lengths are loaded onto the trucks . . . continuing during its rapid assembly in the trench . . . and lasting throughout its long years of service, Transite Sewer Pipe makes important contributions to more efficient, economical sewage disposal.

Consider this summary of money-saving advantages:

Fast installation. Transite's light weight means easier handling . . . more pipe per truckload. Its long 13-foot lengths reduce the number of joints in the line, speed up assembly.

Less infiltration. Its tight sleeve-type joint minimizes infiltration and cuts down on the sewage load at the disposal plant.

High flow coefficient. The smooth interior surface of this asbestos-cement pipe (n=.010) frequently permits the use of smaller pipe, or flatter grades with lower trenching costs.

Corrosion-resistant—outside, inside and all the way through! Transite's asbestos-cement composition, its homogeneous, dense structure and its low free-lime content result in a high degree of corrosion-resistance.

* * *

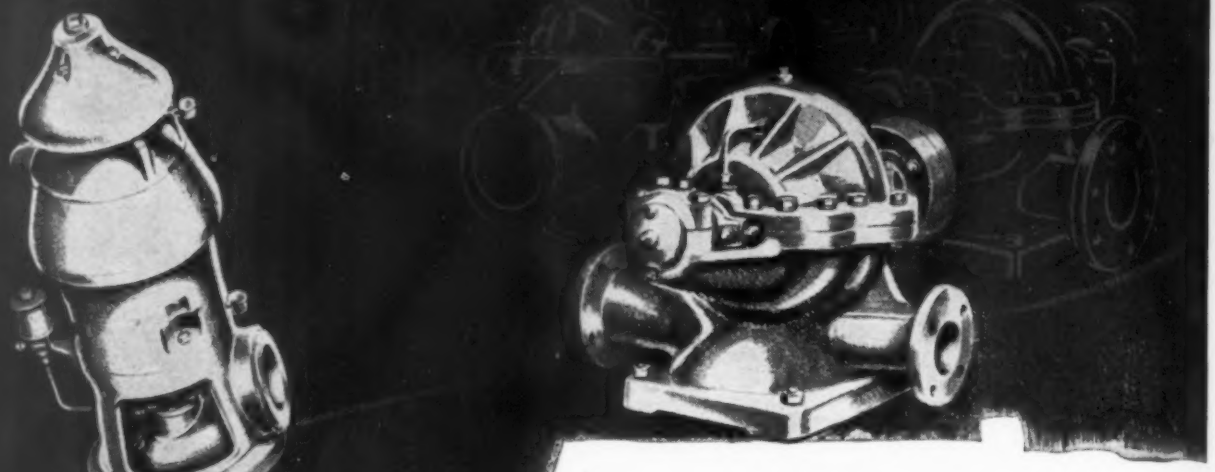
Further details on Transite Sewer Pipe for gravity lines are given in Brochure TR-21A; on Transite Pressure Pipe for force mains, in TR-13A. For copies, write Johns-Manville, 22 East 40th St., New York 16, N. Y.

Johns-Manville

TRANSITE SEWER PIPE for gravity lines

JM PRODUCTS

TRANSITE PRESSURE PIPE for force mains



It's a family matter!

You can bring the widest variety of problems about fluids-moving to Fairbanks-Morse—*and keep them in the family!* Here's a single source—world-known and pump-wise—of proved pumping equipment, including the largest to the smallest centrifugals, vertical turbines and a broad line of special application types.

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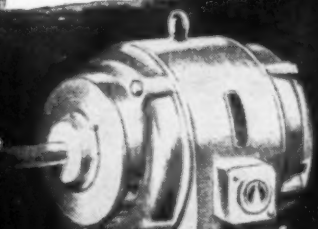

SILENT MEMBER— **An added advantage is the line of electric motors designed and built by Fairbanks-Morse—for use on Fairbanks-Morse pumps. *They cut your pump selection job in half*—give you a pump manufacturer ready to take *all* the responsibility in selecting your pump and the power to operate it!**

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PUMPS

meter replacements dropped 80 per cent

following Threshold Treatment with Calgon!*

When monthly replacement of meters totals nearly 2 per cent of all meters in service, the problem is really serious for any water supply system.

That was the situation confronting one Ohio community in 1940—and to make it worse, no reason for this undue corrosion could be determined.

Finally the use of Calgon was proposed. Threshold treatment, using only 2 p.p.m. of Calgon proved effective almost immediately. Meter replacements dropped to less than one-fifth of the former total, and have remained at that level ever since.

In addition the increased registration due to corrosion-free meters more than paid for the cost of Calgon.

Frankly, any explanation of the reasons why Calgon produced this result would be in the realm of theory, for the corrosion of copper, brass and bronze is still imperfectly understood. We know, however, that similar results have been obtained in other places. If corrosion of meters is one of your problems, it will be worth your while to try Calgon.

Other advantages of Calgon treatment are thoroughly established. Calgon is used in the water supply systems of hundreds of communities to prevent scale, inhibit corrosion of iron pipes, stabilize pH values, and prevent precipitation of dissolved iron.

We will be glad to give you full information about the use of Calgon in your system.

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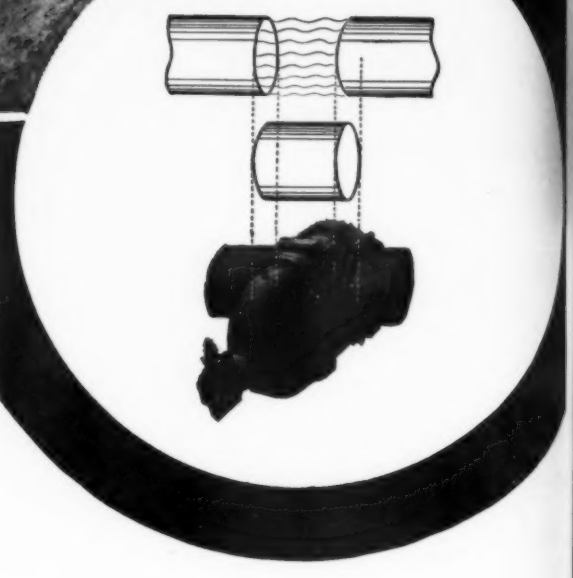

With a SMITH Valve Inserting Machine you can insert valves up to 48" in size *WITHOUT shutting off the flow, lowering pressure, or draining the line for as much as one minute.* There's no need of interrupting service, interfering with fire protection, riling the water, or transporting bulky pumping equipment to the point of insertion. The entire operation is simple and economical. Insertions can be made on any kind of pipe—cast iron, steel, wood or asbestos-cement.

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STOP TUBERCULATION...

with

Material and Method of Application

Perfected by Dearborn

TRADE MARK REGISTERED

Waterworks No-Ox-Id #6 is compounded specifically as a pipe lining and coating to prevent corrosion and tuberculation. It is dense, tough, elastic, and flexible, exceedingly low in water absorption, bonds perfectly with the metal and does not deteriorate by oxidation. Contains proven rust inhibitors. Because of the above properties, maintenance of the initial high C Factor of 156 in the Hazen-Williams formula is assured. Waterworks No-Ox-Id #6 imparts no taste, odor, or contamination to water.

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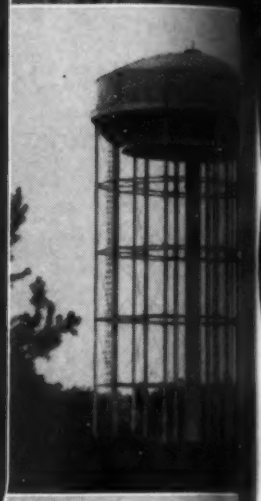

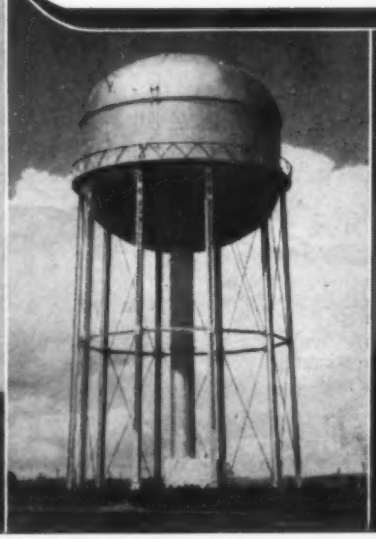

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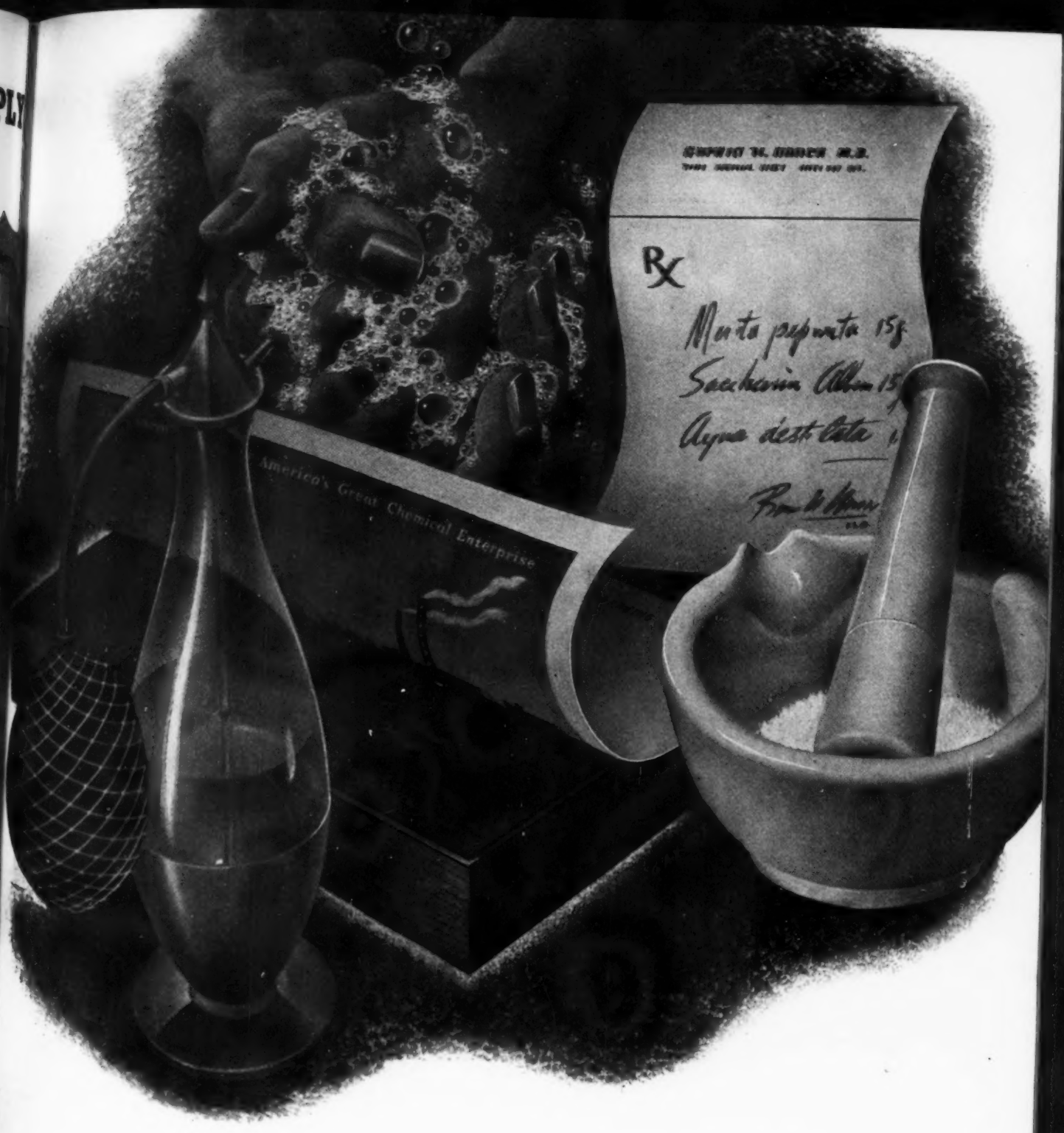

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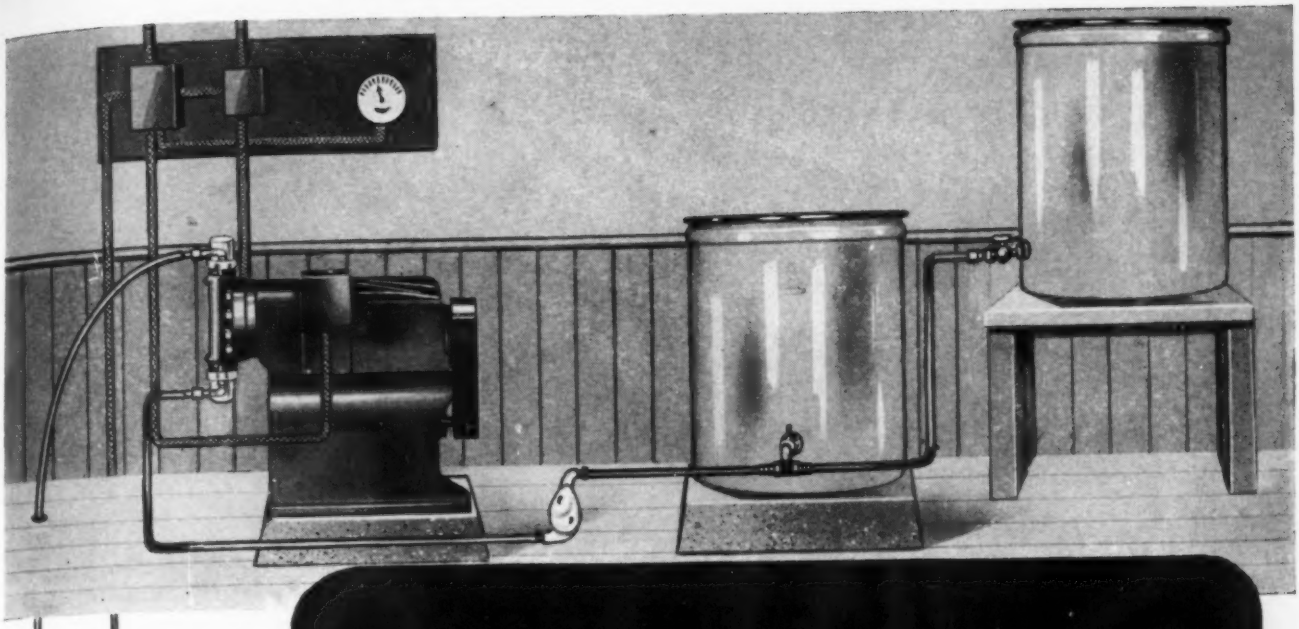

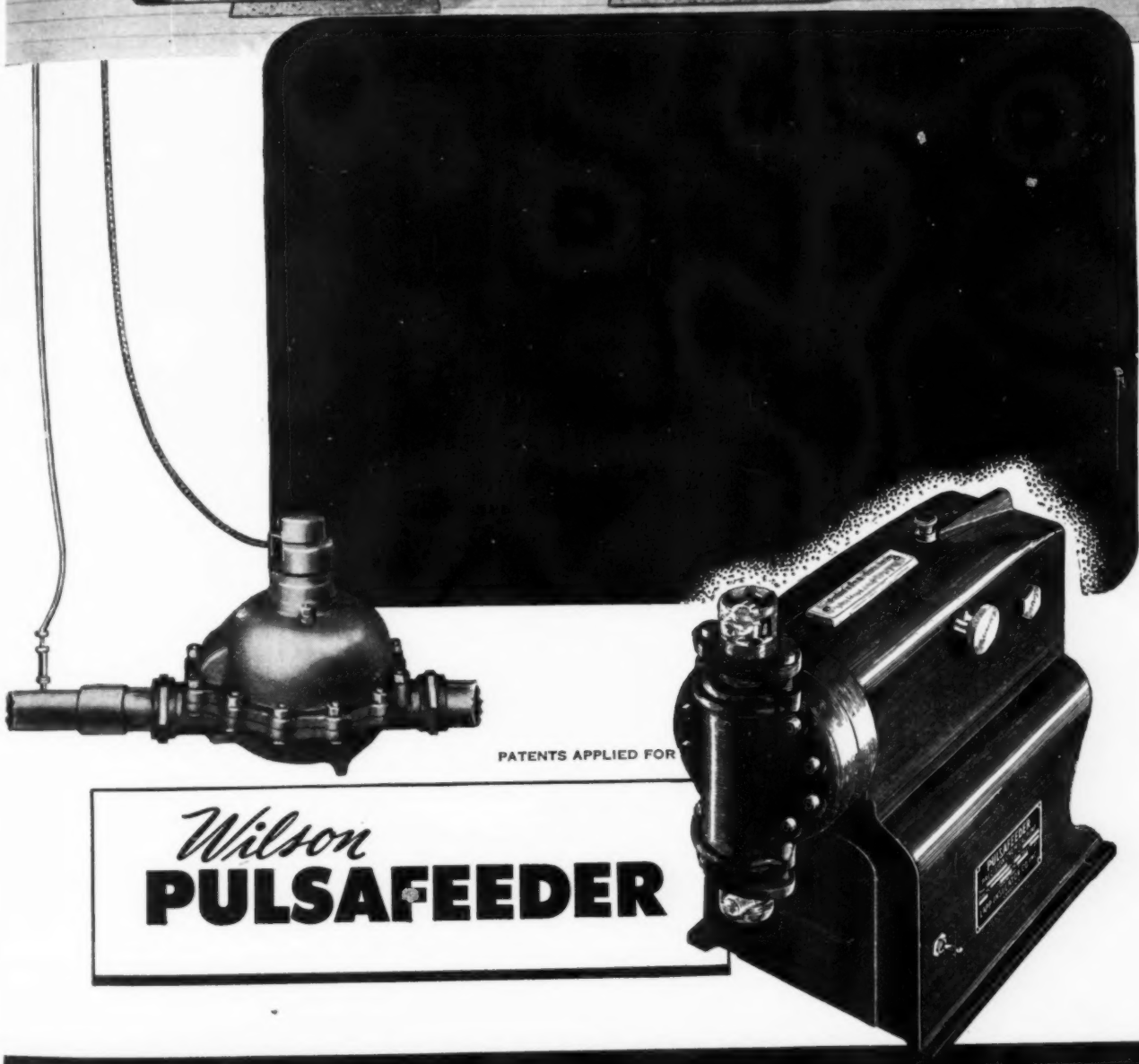

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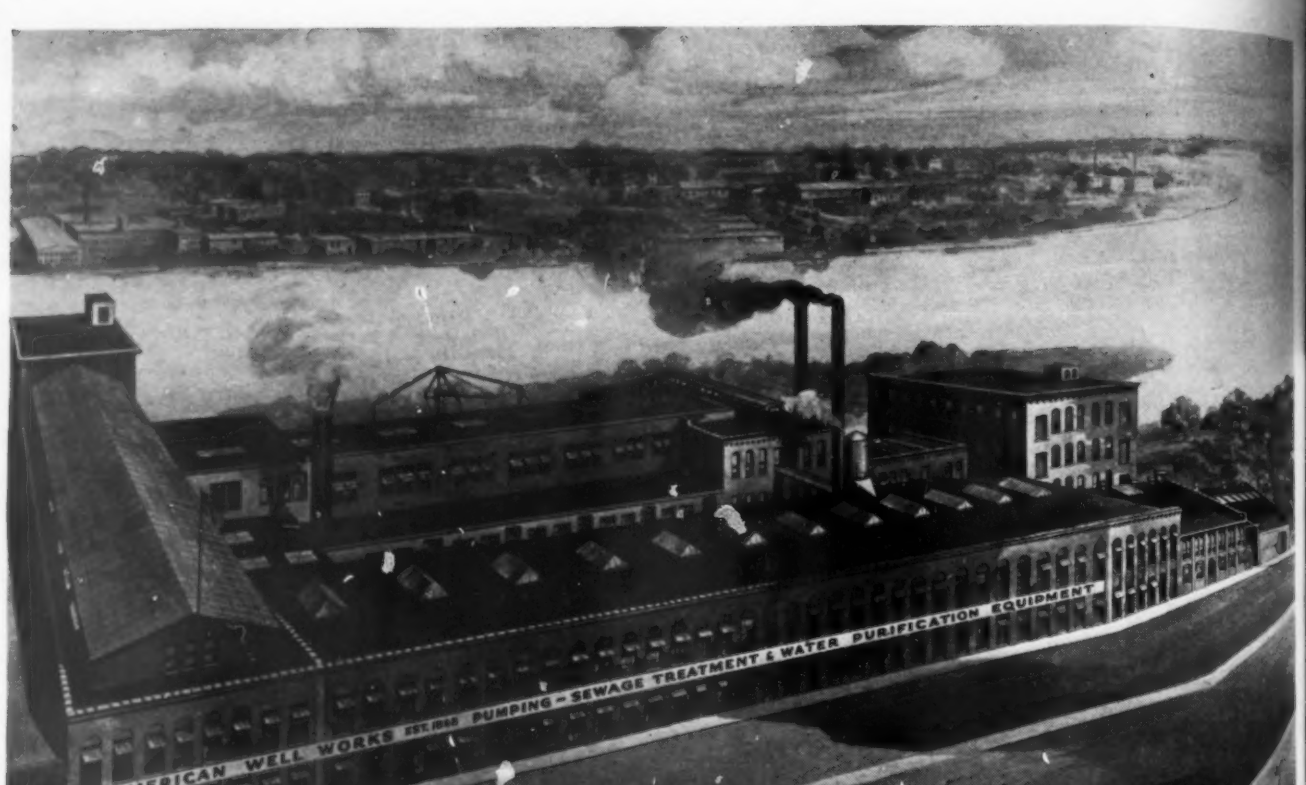

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will keep out of trouble longer if jointed with

Tegul-MINERALEAD

Lines jointed with *Tegul*-MINERALEAD will stand water at high temperatures, as well as low. Because initial leakage is less with *Tegul*-MINERALEAD, laying moves along fast and trenches may be closed at once. This compound is easily handled in winter and summer alike. Skilled labor and deep bell holes are not needed. The 10-lb. ingots are easily packed for shipment, easily handled at destination.

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Saves you Money

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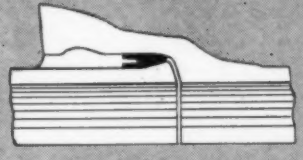
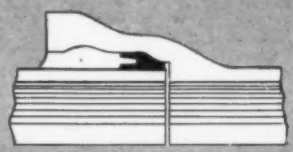
is an important supplementary aid in jointing Bell & Spigot lines. It does away with need of repeated hypochlorite flushings—saves water—facilitates repairs by giving dry joints. Works with *Tegul*-MINERALEAD, lead or Portland Cement . . . and serves on



BEADED End Pipe

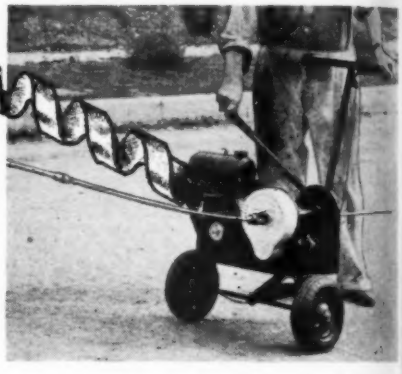


STRAIGHT End Pipe

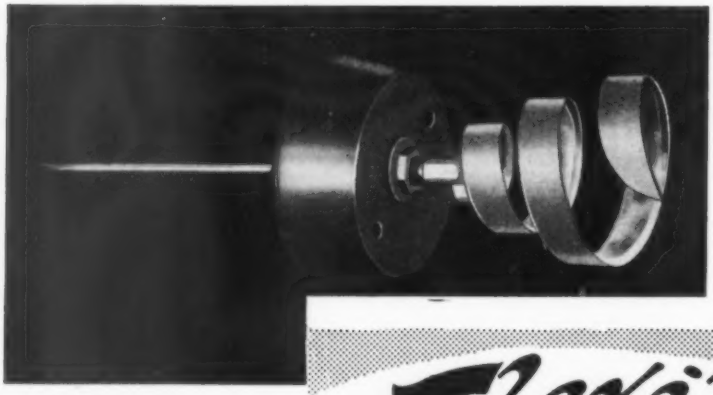
A Practical PIPE DREAM

Back in 1934, "the practical pipe dream" or idea of using an auger and flexible rod powered by a motor for cleaning pipe proved successful. In fact, so successful that today 78% of the cities in the United States own and use Flexible Sewer-Rod Equipment.

Flexible tools and methods eliminate the time-consuming, hot, unsanitary part of the work. They eliminate more than 50% of the dig-ups once thought necessary. Actually a few men equipped with Flexible tools clean more pipe than an entire crew can using old methods. What is your pipe cleaning problem? Flexible has never been stumped yet on any pipe cleaning job and welcomes your questions. We will be glad to send an illustrated catalog upon request.



Workmen at left are placing Flexible rod guide in manhole with Flexible rod and tool ready for action. At right is power unit.



Root auger at left, attached to sand cup, is one of the many tool attachments for Flexible Sewer-Rods. At right the Flexible rod is shown rolled on the regular rod reel.

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Flexible SEWER ROD EQUIPMENT CO.

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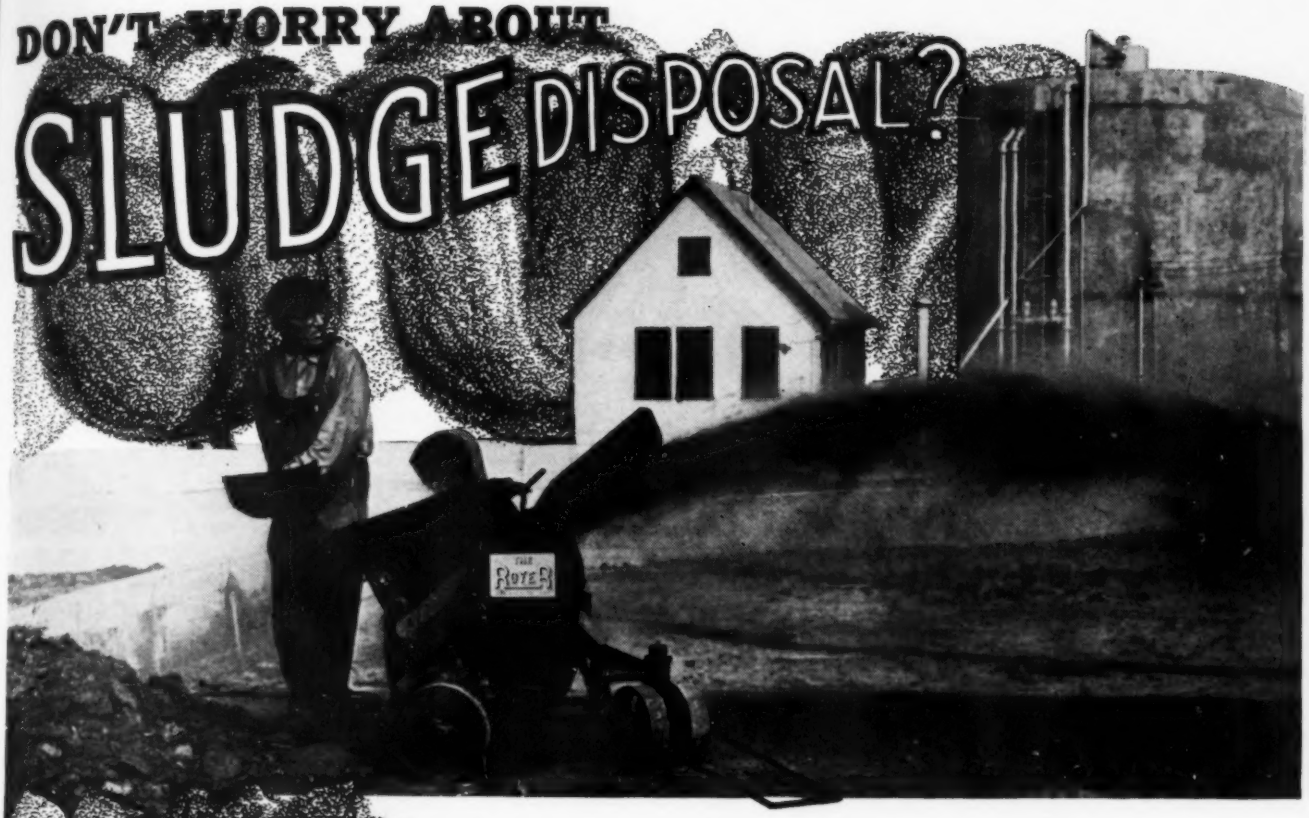
DON'T WORRY ABOUT SLUDGE DISPOSAL?



THE ROYER TURNS THIS COST ITEM *into a Profit!*

If you are spending good money to incinerate or bury your sludge, or spending time looking for places where you can bury it without creating a nuisance, here's the answer. You can substitute a profitable income for your present disposal cost with a Royer Sewage Sludge Disintegrator, as hundreds of other sewage works have done.

Your sludge contains values you can cash in on — splendid fertilizing values that stimulate the growth of plant life, including food crops. Of course the sludge cake in your drying beds is hardly in shape for use as a fertilizer, but the Royer converts it into a ready-to-use fertilizer at a cost usually less than that required for burning or burial.

All the labor required is shoveling the sludge cake into the hopper of this rugged, inexpensive machine, which does all the rest. The sludge is thoroughly shredded, mixed, and further dried. Sludge with a moisture content up to 51% is readily handled. Trash is automatically eliminated. The Royer discharges onto pile or truck an effective and marketable fertilizer.

Sewage plants using Royers have found this sludge fertilizer in constant demand among growers of food crops, florists, nurserymen and home gardeners; usually on a cash-and-carry basis. In some cities the park board, municipal golf course or cemetery purchases the greater part of the fertilizer output.

Twelve money making Royer models—electric motor, gasoline engine or belt-to-tractor driven—to meet the needs of every sewage works.

Send for this Book

Our "Sewage Sludge Utilization Datalog" contains full information on sludge fertilizer and how to profit from its production.

ROYER

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Close Quickly and Quietly

The cushioning effect of the stream against the short flap of the balanced disc permits quick, quiet closing. This prevents water hammer and resultant destructive stresses in pipe lines. Head losses are cut to about a quarter of those caused by ordinary types of check valves. Substantial power savings are possible when these valves are installed on pump discharge lines.

Send for new bulletin containing complete information.

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COMING!

"Cavitation in Pumps"

Is an excellent discussion of the phenomena and truths concerning cavitation in centrifugal pumps. This paper reveals some misconceptions generally held concerning the causes of cavitation, and suggests methods of correction of this noisy and destructive condition, which is more commonly experienced than is generally realized. This article was prepared at our special request in order to clear up many false conceptions concerning the cause, effects and proper measures for the correction of damaging cavitation. The author is—

ROBERT W. ANGUS, M.E., Prof. Emeritus,
Dept. of Mechanical Eng., Univ. of Toronto.

"Stopping Water-Hammer"

Reveals the method employed to correct a serious water-hammer problem at a small pumping station. A correctly proportioned air chamber did the job effectively and economically. A description of the installation in detail, with an exhibit of performance, comes from—

MAURICE A. LIBBY, Supt.,
Bath (Me.) Water District.

"Corrosion Control by Deaeration"

Is the subject of an article which describes the equipment and method used in controlling corrosion of an important pipe line by cold water vacuum deaeration of a large industrial water supply. The scheme has now been in operation for a number of years and operating data reveal its effectiveness and economy. The contributor of this article is no less an authority than—

SHEPPARD T. POWELL,
Consulting Chemical Engr., Baltimore, Md.

"Stop Guesswork in Copper Applications"

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Is frequently of more importance in insuring efficient performance of electric motors than is generally realized. The primary consideration in commutator maintenance and the most satisfactory and simplified methods of providing such routine maintenance are set forth by—

C. B. HATHAWAY, Mgr. Motor Dept.,
Westinghouse, Pittsburgh, Pa.

Trickling Filter Operation and Results—Part II

Is a three-part treatise on the interpretation of single and two-stage high capacity trickling filter results and the chief causes of poor results. This exhaustive study, with particular reference to "Aero-filters," has been made by—

J. A. MONTGOMERY, Chief Engineer,
Lakeside Engineering Co., Chicago.

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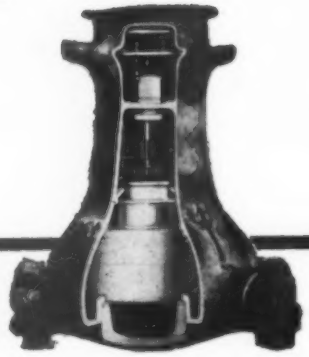

MODERN PARTS IN 1898 METER

Lack of Meter Depreciation Astounds Water Rate Probers

Depreciation, bugaboo of industry, is not part of a water meter expert's worries.

There is no such thing, says Henry Horandt, New York meter expert and graduate of Rensselaer Polytechnic Institute who was summoned by Rochester and Lake Ontario Water Service Corporation to appear before the Public Service Commission.

The commission, investigating the rates charged by the company, was mystified by the company's statement that water meters did not depreciate.

Almost unheard of they said.

So up from New York came Horandt who backed up the company in every detail. He took a meter apart under the eyes of the commission and explained its workings. A meter manufactured in 1898, he said, is repaired with parts manufactured today.

Not only is there no depreciation, but there is scarcely any change in design. So he took an old meter, fitted in new parts, and it worked perfectly.

Under PSC regulations the company must test its meters every five years. The company more than complies with these rules, officials said.

Rochester "Democrat and Chronicle"

EXPERIENCED Operators agree that whether 1 or 40 years old, Trident Meters emerge from the repair shop capable of passing the strictest repaired meter test, sometimes literally better than when new, and ready for many more years of hard service. In other words, they never need to be retired!

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134

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Over 6 million made and sold . . . the great majority still in service

WATER & SEWAGE WORKS

VOL. 93, No. 2 FEBRUARY, 1946

A Gillette Publication

SEWAGE AND INDUSTRIAL WASTES IN 1945

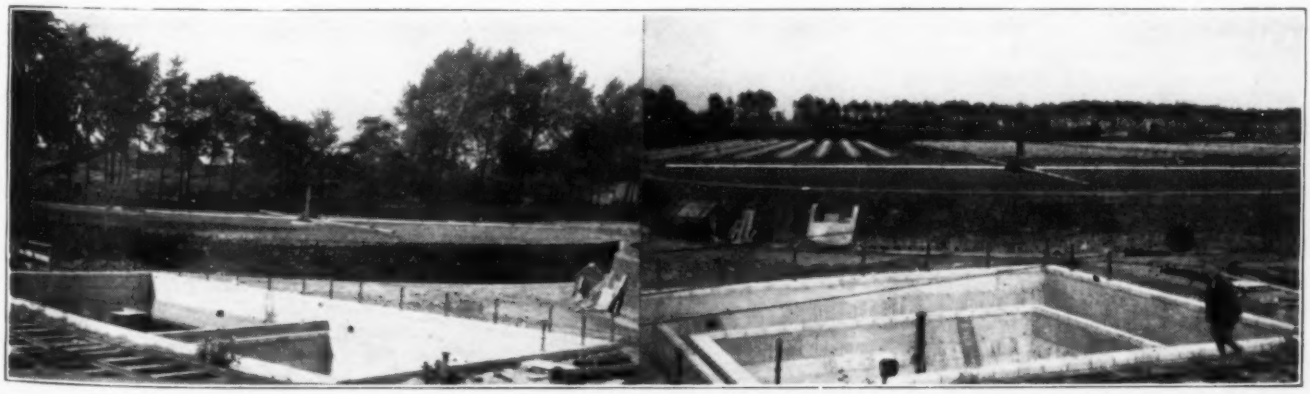
By F. W. MOHLMAN, Ph.D.
Director of Laboratories
SANITARY DISTRICT OF CHICAGO
CHICAGO, ILL.

EVENTS of worldwide importance such as the end of the war, the perfection of the atomic bomb and the occupation of Germany and Japan made the year 1945 a milestone in history, but these momentous happenings did not seem to be reflected in any outstanding discovery or development in the field of sewage treatment and waste disposal. Construction was at a standstill; plant and laboratory research were greatly curtailed because of the absence of sanitary engineers and chemists in military service; and technical meetings were abandoned because of travel and hotel congestion. Consequently progress was retarded in our field, but the seeding material for new developments was not lost. Ideas, like ferments, are hard to stifle and later expand to accelerated progress when the economic environment changes.

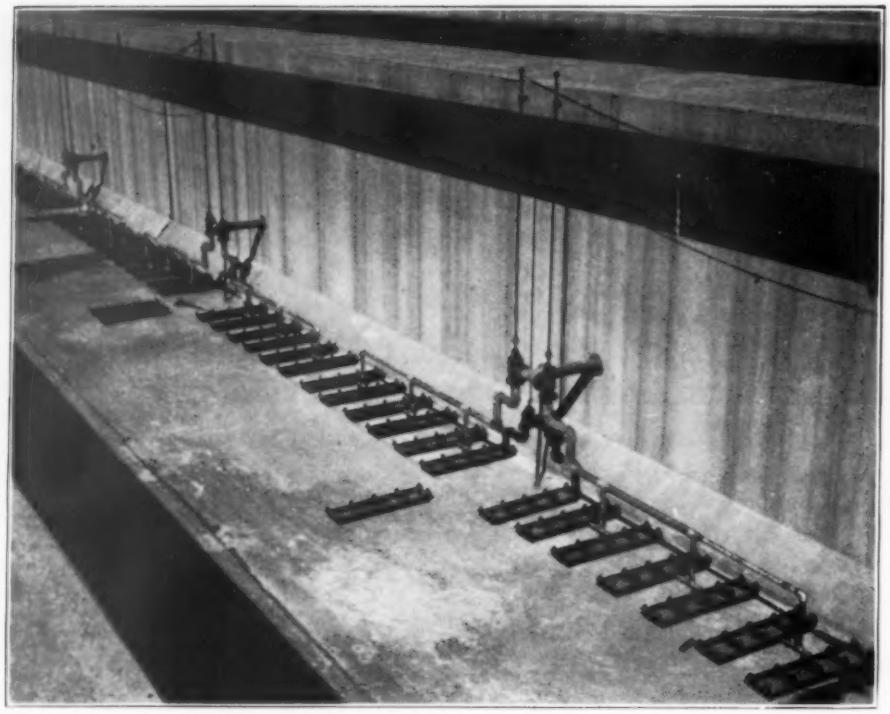
The Author

A glance back to the end of World War I reveals the rise of the activated sludge process as a practical development after the research in 1914-1916, and the war delay had prepared for the construction of plants at Houston, Des Plaines, Milwaukee, and Indianapolis after the war.

If any similar advance will arise out of the Second World War's incubation of ideas, it is difficult to foresee it now. The nearest analogy seems to be the practical development of operation of high capacity trickling filters in military camps and the accumulation of a vast amount of data on the advantages and limitations of these biological devices, old yet new. A Subcommittee of the National Research Council has been working for nearly two years on a report on sewage treatment in military installations, which will be completed this spring. Practically all types of treatment will be discussed, but most of the report will deal with trickling filters. The information will augment that contained in the report of the Upper Mississippi Board of Engineers in 1944 on high capacity filters in small municipalities. Comparative studies at other places have been reported from time to time in the past several years, including Spartanburg, S. C., and various small cities in California, Minnesota and Wisconsin. A special study on the effect of "raindrop" distribution has been made at Neosho, Mo., by the U.S.P.H.S. on behalf of the Upper Mississippi Board of Engineers, but the results are not yet available.



The Alternating Filters of Monmouth, England
(Settling tanks in foreground; standard trickling filters in background.—Snapshots by the author.)



Anderson Holders and Removable Aeration Plates—Chicago

A feature of the development of high-capacity filters has been the recirculation of effluents from various sources, with and without sludge, also the study in England, on a large scale, of alternating filters, recirculating filters, covered aerated filters, and the "cyclo-nitrifying" filter, the latter as an efficient method of producing nitrates from a partly-treated effluent.

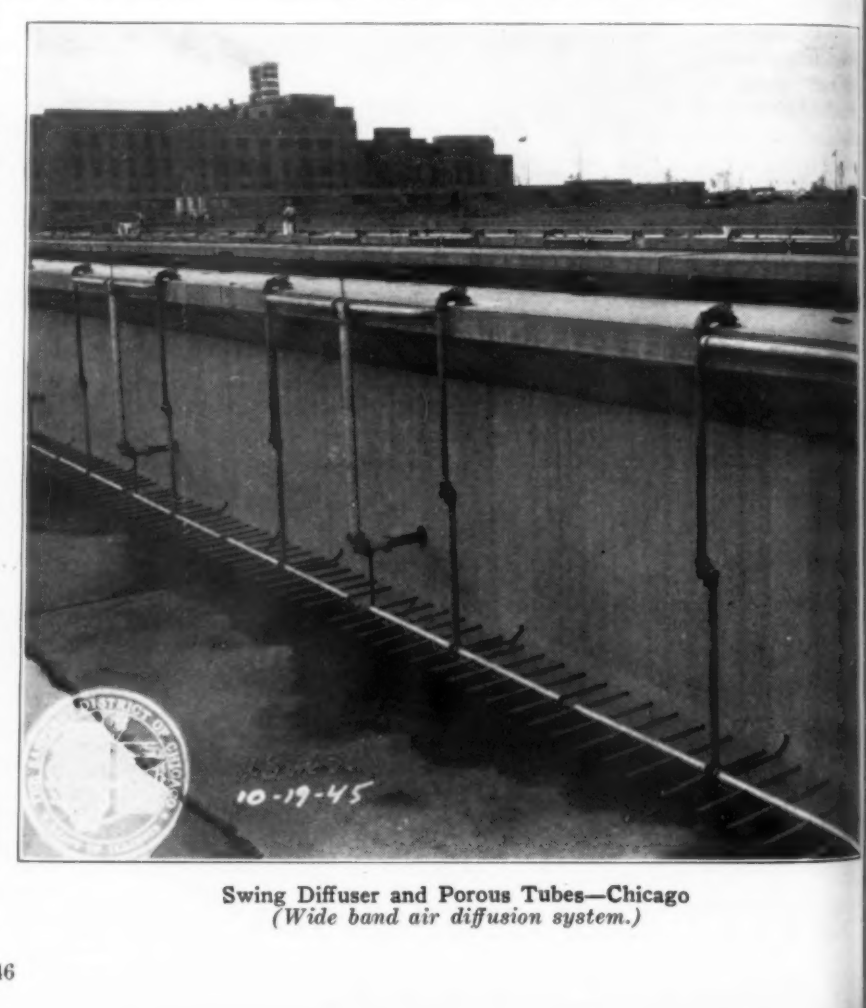
The proponents of high-capacity filters claim they produce effluents of equal quality with those from standard filters and frequently the B.O.D. of the effluents may be quite similar in parts per million, but the high-capacity effluent practically never contains nitrates, whereas a standard filter oxidizes ammonia almost completely to nitrite or nitrate during most of the year and thus accomplishes more oxidation and more complete stabilization of the unstable solids in the applied sewage. However, there is considerable doubt as to whether complete nitrification is necessary or advantageous—it is certainly not worth what it costs—consequently partly treated effluents containing no nitrate but with a low B.O.D. are acceptable for most conditions of disposal. Thus high-rate filters or short-period activated sludge have had rapid development.

TRICKLING FILTERS

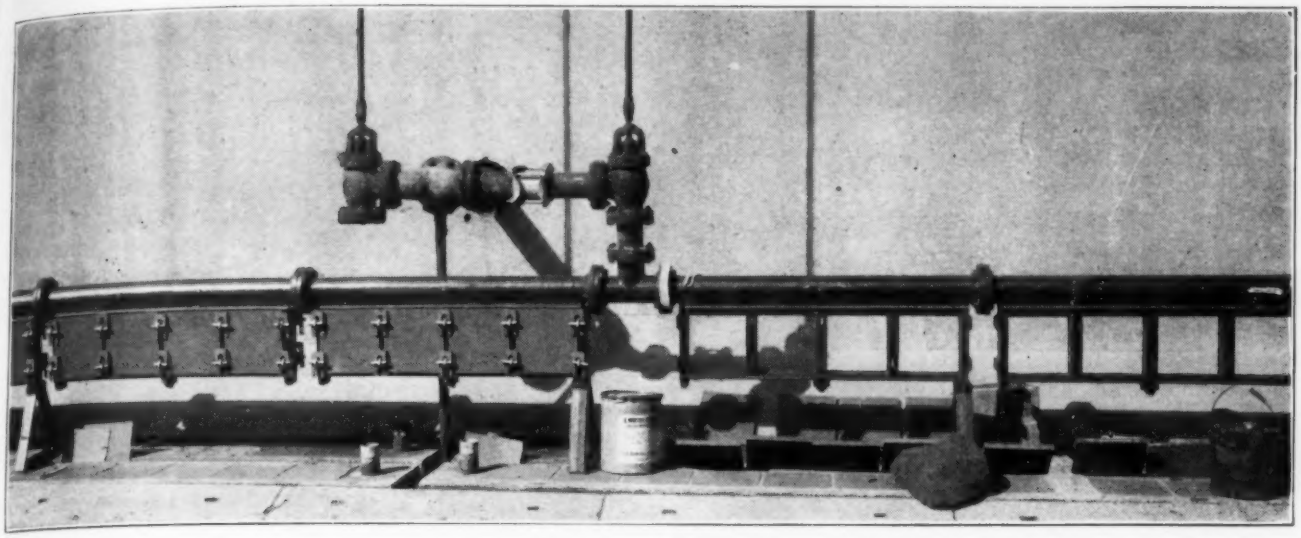
Contemporaneous development of modifications of trickling filters has occurred in the U. S., England and pre-war Germany. The U. S. high-rate filters are called "bio," "aero" and "accelo"; the features of all have been widely publicized. Briefly, main features are the shallow depth of "bio" filters and high rates of recirculation, "aero" filters up to 6 or 8 ft. deep with "rain-drop" application, "accelo" also with special distributors. The English studies have included the "alternating" filter, in which first and second stages are reversed daily; the "recirculating" filter; the covered aerated filter, originally developed in Germany; and the "cyclo-nitrifying" filter, designed to produce nitrate from the ammonia left in the effluent from a non-nitrifying filter or bio-aeration tank.

The "alternating" filter has been studied for seven years by the Department of Scientific Research. Filters at Minworth (Birmingham) were remodelled (see accompanying photograph) so that four filters were available, each 120 ft. in diameter and 6.0 ft. deep. Filter A was operated normally at 80 Imp. gal. per cu. yd. per day; Filters C and D were operated as alternating filters at 240 gal. per cu. yd. per day; and Filter B as a recirculating filter at 200 gal. per cu. yd. per day, with recirculation of an equal volume of effluent, making the gross rate 400 gal. per cu. yd. per day. Settled sewage was applied with a 5-day B.O.D. of about 150 ppm. and 35 ppm. ammonia nitrogen.

The loadings in lb. B.O.D. per acre ft. were as follows:



Swing Diffuser and Porous Tubes—Chicago
(Wide band air diffusion system.)



P. F. T.—Piatt Vertical Plates—Chicago
Plates in place in frames on left (both sides); open frames on right

Filter	Mil. U.S. Gal. per Acre per Day	Lb. B.O.D. Applied per Acre Ft. per Day
A. Normal	.93	194
B. Recirculating	2.32	485
C + D. Alternating ..	2.79	582

These low surface rates and low B.O.D. loadings are all in the range of standard filter rates and loadings in the U. S., as contrasted with high-capacity rates of about 15 mgad. and 3000 lb. B.O.D. per acre foot. However, more or less complete nitrification is still considered necessary for trickling filters in England and the filter medium is usually finer than in the U. S. The superiority of the alternating filters, as indicated by these tests, was modified by the fact that Filter A (normal) oxidized about half of the 30 ppm. ammonia N to nitrites plus nitrates whereas Filters C and D oxidized only 10 ppm. or less. Otherwise B.O.D. values and oxygen consumed were almost identical.

The enclosed, aerated from the top, filter was not tested at Minworth, but tests have been made at the Dalmarnock Works at Glasgow, since May, 1938, and results have just been reported. I saw two of these filters at Iserlohn in the Ruhr District in 1938; a sketch of their design features is given on p. 338 of "Modern Sewage Disposal." This type of filter has also been installed in South Africa, two experimental units in the British Isles (Glasgow and Wolverhampton) and there has been recent interest in the filter in the U. S., with no results reported to date.

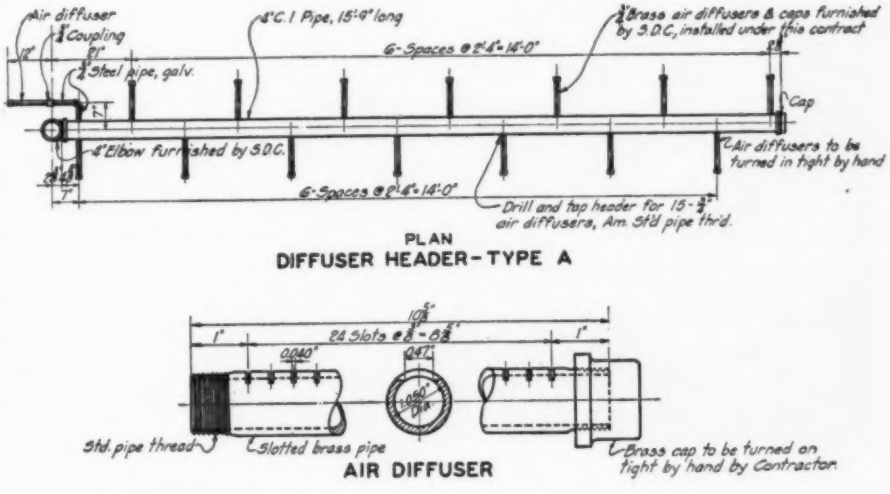
The Glasgow tests were made on a filter 52 ft. in diameter and 18 ft. deep, with original media mainly ¾ in. stone 15 ft. deep under coarser media at the top and bottom. The open filters at Glasgow are 6 ft. deep and the stone is mainly of 2½ in. size; consequently there was at first quite a difference in the two types. The deep, enclosed filter soon clogged, however, and the fine stone was replaced in August, 1939, by 14 ft. of stone 1½ to 2 in. diameter between 4 ft. of coarser top and bottom media. Thereafter the filter did not clog seriously, and the rate of dosage was 282 Imp. gal. per cu. yd. per day as compared with 127 gal. for the open filters, a rate 2.22 times as great. The rates and analytical results in ppm. were as follows:

	Influent	Effluents Enclosed	Open
Ammonia N	14.1	12.4	9.7
Nitrate N	...	1.5	3.9
Ox. Cons., 4 hr.....	114.4	39.9	47.3
5-day B.O.D.	135.6	24.2	35.4
Lb. B.O.D. applied per acre ft.		616	278
Volumetric rate, mgad.		9.82	1.47
Depth, ft.		18	6

Odors and flies were absent from the enclosed filter, but were also not a nuisance from the open filters, which have been in service for 25 years. Fungus growth was sometimes troublesome on the surface of the enclosed filter, from 3 to 7 tons having been removed each year. The fungus increased the air pressure 2.4 in. of water but when clean it fell to 0.4 in. Air was supplied at the top of the covered dome by a 25 in. fan, and 1.65 hp. motor, with a capacity of 3,000 cu. ft. per minute.

The cost of the enclosed filter was £6,250.

In comparing effluents from standard, recirculating, enclosed and alternating filters as developed in England, the alternating filters seem to have given best results, with effluent


Air diffuser
Coupling
Steel pipe, galv.
4" C.I. Pipe, 15'-0" long
6 Spaces @ 2'-4" = 14'-0"
Brass air diffusers & caps furnished by S.D.C., installed under this contract
Cap
4" Elbow furnished by S.D.C.
Air diffusers to be turned in tight by hand
6 Spaces @ 2'-4" = 14'-0"
Drill and tap header for 15 - ¾" air diffusers, Am. Std. pipe thrd.
PLAN
DIFFUSER HEADER - TYPE A
24 Slots @ ⅛ - 6⅛"
.040"
.047"
Std. pipe thread
Slotted brass pipe
Brass cap to be turned on tight by hand by Contractor
AIR DIFFUSER

Diffuser Header and Detail of Experimental Slotted Brass Pipe Air Diffusers at Chicago

B.O.D. at Minworth around 10 ppm. as compared with 25 to 35 ppm. in the enclosed filter effluent at Glasgow. The depth of the Glasgow filter, 18 ft., was excessive, other enclosed filters in South Africa and Germany averaging about 13 to 15 ft. deep. There might be royalty charges on the enclosed aerated filter as installed by the Enclosed Sewage Treatment Company. The alternating filters require an additional sedimentation stage; recirculating filters require additional pumpage, intermediate settling and enlarged settling tanks.

Another variation is under study at Huddersfield, namely high-rate primary filters followed by secondary filters at lower, but still relatively high, rates. This sounds like American high-rate treatment, but results are not yet available.

In view of all this work in progress in England, we will undoubtedly soon hear of studies along similar lines in the U. S. It is difficult to evaluate the relative merits of all these combinations and permutations, especially if presented by equipment companies eager to promote new and competitive processes.

Date Oct. 1945	MGD.	D.O. End of Aer. Tk.	Aer. Tk. Solids PPM.	Sl. Index	Sludge Ret. per Ct.	Effective Aer. Period* Hr.	Air, C. F. Gal.	Air C.F. per Lb. B.O.D. Removed
10	180	4.7	1750	77	57	6.0	.84	750
11	187	3.5	1860	81	40	4.8	.74	880
12	162	3.6	1930	79	37	5.8	.83	820
13	168	4.2	1640	110	52	5.4	.80	760
†14	193	4.4	2090	83	38	4.8	.69	1220
15	188	3.5	2410	80	42	4.8	.71	1120
16	165	2.5	2440	88	44	5.6	.79	900

*Aeration period based on influent not incl. ret. sludge. †Sunday.

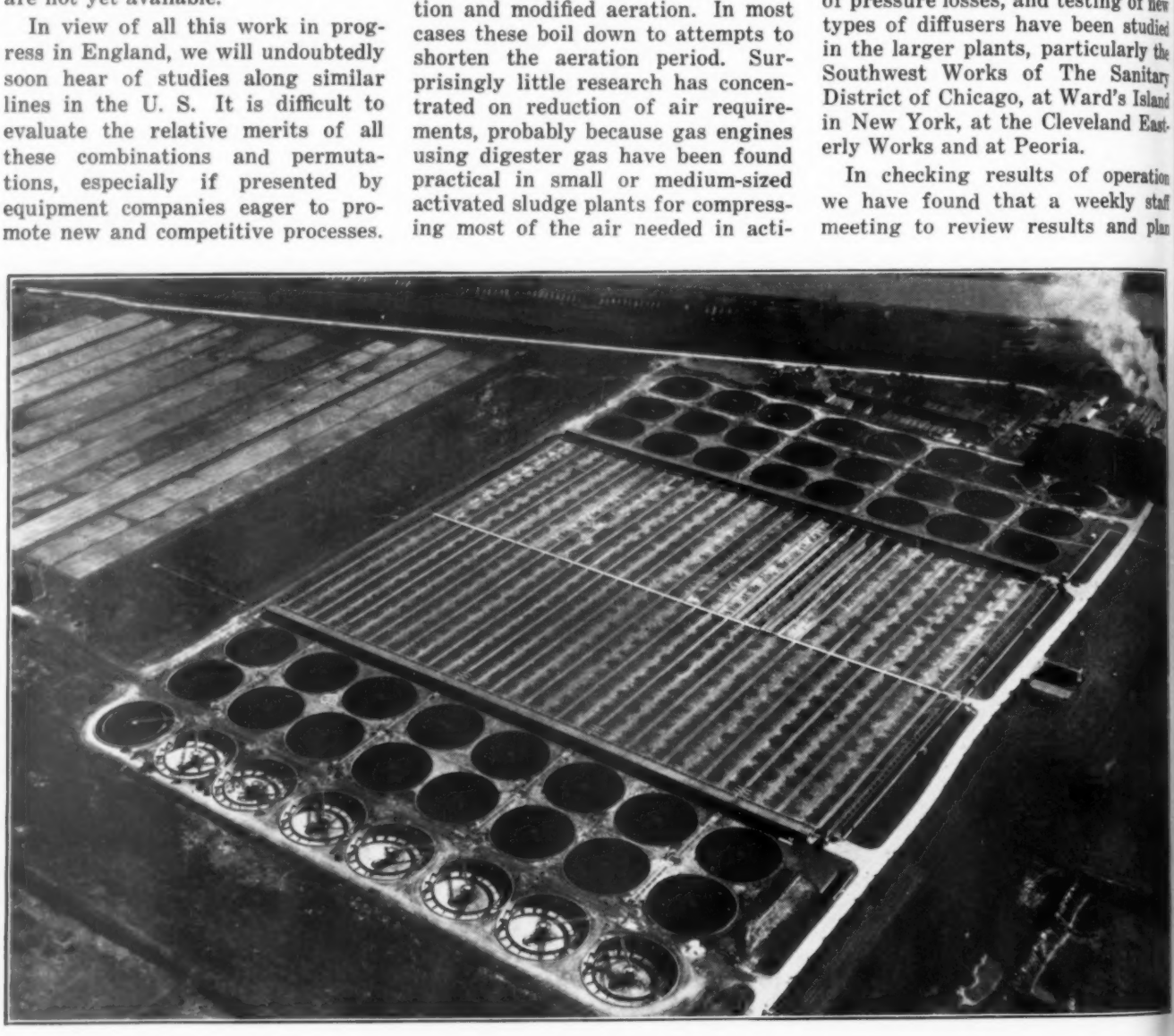
Date Oct. 1945	5-day B.O.D. Raw	B.O.D. Settled	PPM. Effluent	Lb. B.O.D. Removed per 1000 C.F. Aer. Tks.	Suspended Solids, PPM. Raw	Settled	Effluent
10	183	140	5	34	199	136	11
11	170	118	17	31	198	120	11
12	164	138	17	32	239	130	12
13	196	139	12	35	286	162	12
†14	119	82	14	21	152	115	16
15	127	98	22	23	192	117	23
16	173	125	20	28	...	126	20

†Sunday

ACTIVATED SLUDGE

High-rate operation of trickling filters has had its effect on activated-sluge development, leading to studies of high-rate activation in several forms, so-called tapered aeration, step aeration, "accelo-biox" aeration and modified aeration. In most cases these boil down to attempts to shorten the aeration period. Surprisingly little research has concentrated on reduction of air requirements, probably because gas engines using digester gas have been found practical in small or medium-sized activated sludge plants for compressing most of the air needed in activated sludge operation. However, in large plants it is still necessary to buy or produce power for air compression, and efficient use of air is important. Diffusion of air, production of D.O. in the aeration tanks, cleaning of porous plates, reduction of pressure losses, and testing of new types of diffusers have been studied in the larger plants, particularly the Southwest Works of The Sanitary District of Chicago, at Ward's Island in New York, at the Cleveland Easterly Works and at Peoria.

In checking results of operation we have found that a weekly staff meeting to review results and plan



The World's Largest Becomes Even Larger.

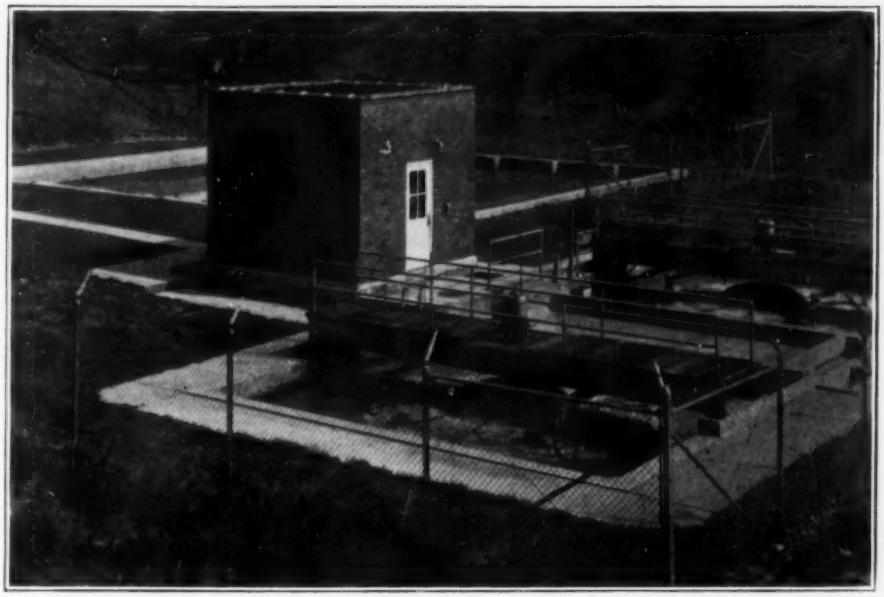
Enlargement of the gigantic S. W. Sewage Treatment Works of Chicago involves addition of settling tanks in foreground of new design with ring effluent launders well out from side walls. Empty aeration units are being equipped with experimental swing type tubular diffusers. On left, sludge beds of West Side Plant; drainage canal in background, and in lower corners appear two of battery of standby sludge lagoons.

the following week's operation has been of value and some 185 of these have been held at the Chicago Southwest T. W. in the past three and one-half years.

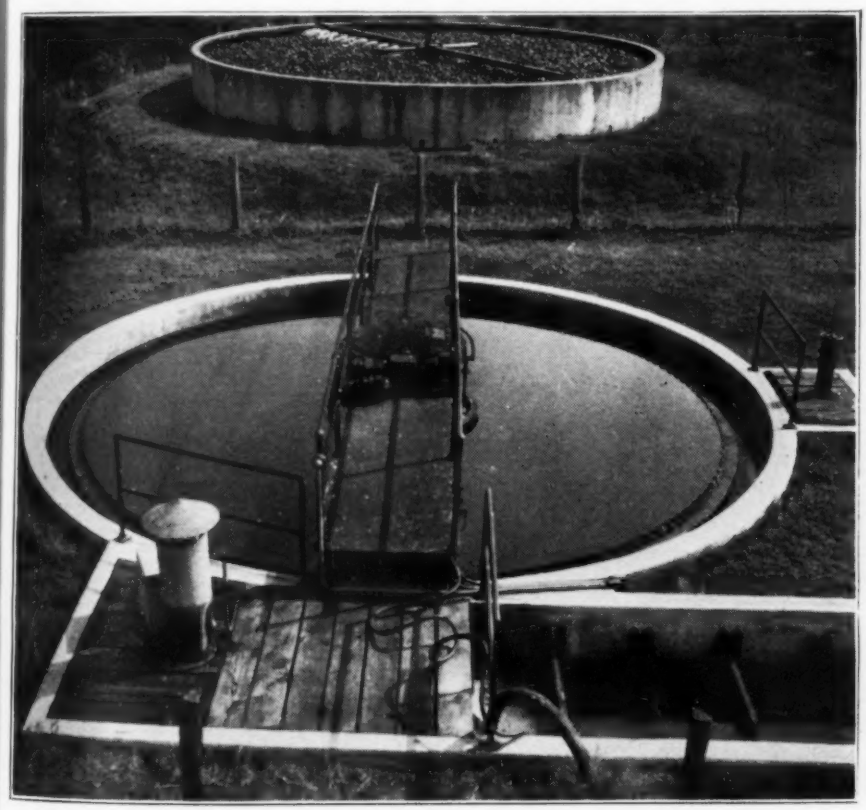
A typical week's data sheet, referring to Battery A, is shown on p. 48.

A discussion of the data follows:

The D. O. is preferably held around 3.0 ppm. at this time, but the content increased during the weekend, when packinghouse wastes were absent, even though the air rate was decreased. Aeration tank solids were too high on the 15th and 16th, but should be held around 1,800 ppm., with sludge return of 40 per cent. B.O.D. of sewage was lower than normal, but efficiency of air use not too bad. However, industrial wastes at the Southwest T. W. cause the air use to average around 900 cu. ft. per lb. of B.O.D. removed, whereas North Side efficiency, with practically no wastes present, averages 500 cu. ft. per lb. of B.O.D. removed. The high air use over the weekend at the Southwest is considered satisfactory as it helps to recondition sludge for the heavy weekday load. Effluents during this period were a little below par. It will be noted that the aeration period is figured on influent not including returned sludge. This seems to me a more reasonable basis than the former method of including return sludge, which was logical when all plants made a practice of returning 20 to 25 per cent and various plant records could be compared on the same basis, but since practice has tended toward higher return percentages (we have even gone up to 100 per cent), is seems preferable, for operating control, to compute the period on settled sewage alone and show the percentage return, thus permitting a computation of period based on volume passed through the tanks, if anyone wishes to make such a computation. On this basis, the aeration periods shown above would average 4.4, 3.4, 4.2, 3.5, 3.5, 3.4 and 3.9 hours.

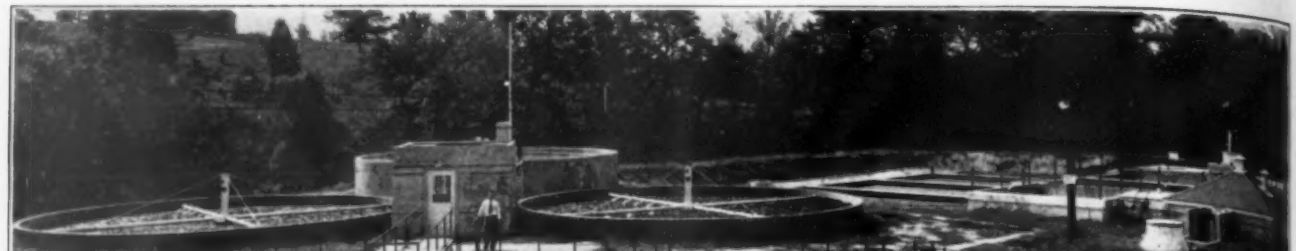


Package Style Activated Sludge Plant at Knightstown, Ind.
(More than a hundred of these standardized "watch-fob" plants now serve small populations.)



Biofiltration Plant Treating Domestic Sewage—2000 Persons, Roslyn, L. I.
(Equipment includes 30 ft. dia. Dorr clarigester, 33 ft. dia. Biofilter, and 26 ft. dia. secondary clarifier.)

Control tests have also been outlined by Dr. Edwards for the Ward's Island plant and operating procedure at San Antonio discussed by Berg. An impressive review of results at the West Middlesex Works was presented by Townend, from 1936 to date. The air supply was .97 cu. ft. per gal. (U. S.), 717 cu. ft. per lb. 5-day B.O.D. removed, average B.O.D., raw 309, settled 171, final effluent 8.3 ppm., sludge index 65 (low), and 2400 ppm. aeration tank solids. Mr. Townend estimates the load from human population at 1,100,000 plus 300,000 industrial waste equivalent. The West-Southwest Chicago proportion in 1944 was 2,600,000 human population plus 3,000,000 industrial. Nitrate nitrogen is very difficult to produce, whereas at Mogden the average was 12.7 ppm. nitrate N with only 717 cu. ft. air per lb. B.O.D. removed, as compared with more than 900 at the Southwest T. W. and practically no nitrate. This illustrates the adverse effect of a high proportion of industrial wastes. At the North Side T. W. the human population is 1,020,000 and industrial pop. equiv. is



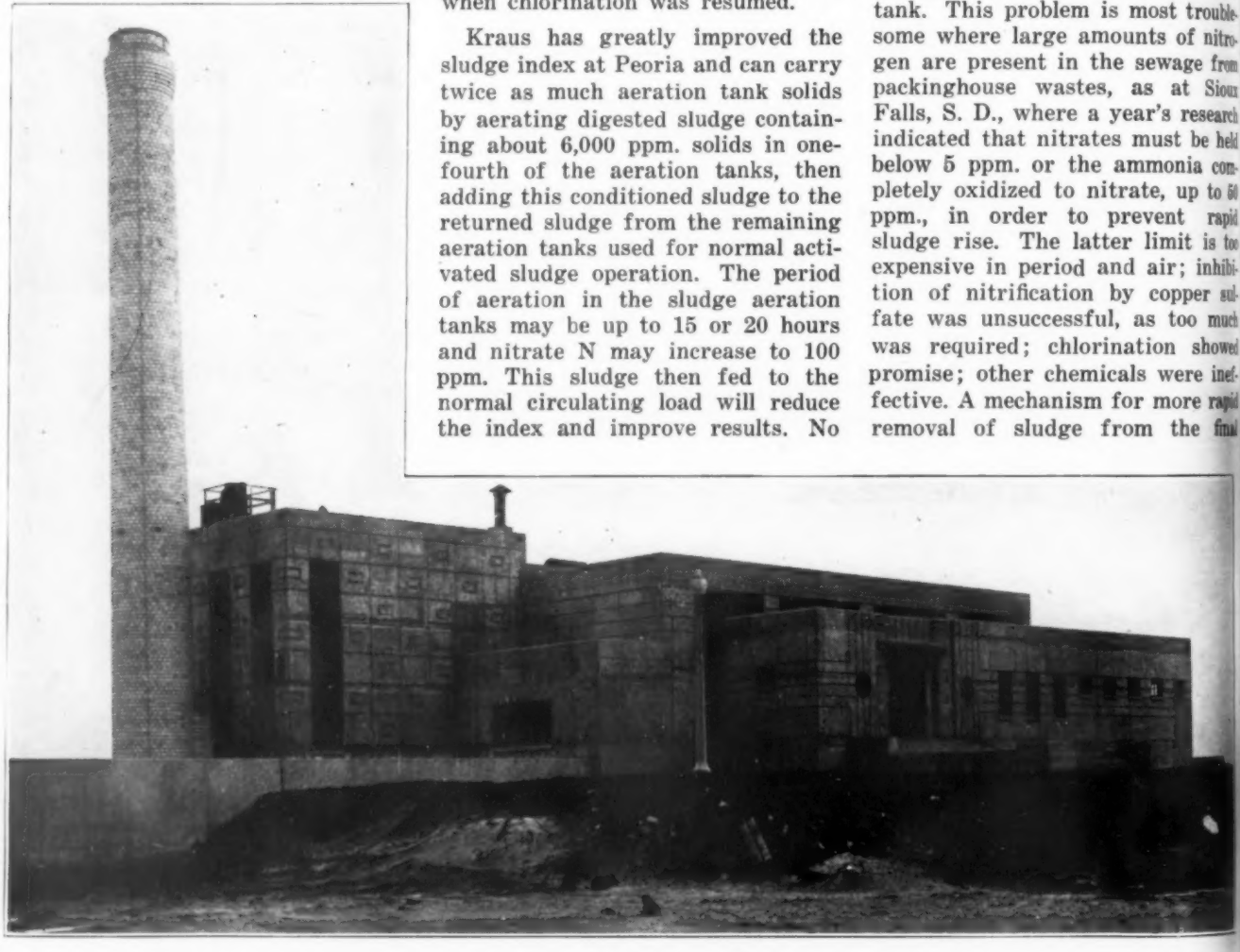
Biofiltration Plant—Elizabethtown, Ky.
(Design flow 0.54 mgd.; pop. 6000—dual recirculation, Dorr equipment.)

less than 50,000. As stated above, the air requirement is only 500 cu. ft. per lb. B.O.D. removed.

Two interesting methods of improvement of sludge index were reported during the year. Tapleshay studied the chlorination of return sludge at several army camp treatment works and his data are more convincing than those of previous tests. Tapleshay's work points to the fact that the amount of chlorine required apparently is a function of the sludge index and the suspended solids in the return sludge, and in most cases averaged around 3 ppm. based on sewage treated. The sludge index increased rapidly when chlorination was stopped, dropping again when chlorination was resumed.

Kraus has greatly improved the sludge index at Peoria and can carry twice as much aeration tank solids by aerating digested sludge containing about 6,000 ppm. solids in one-fourth of the aeration tanks, then adding this conditioned sludge to the returned sludge from the remaining aeration tanks used for normal activated sludge operation. The period of aeration in the sludge aeration tanks may be up to 15 or 20 hours and nitrate N may increase to 100 ppm. This sludge then fed to the normal circulating load will reduce the index and improve results. No additional air is required over that used in normal operation.

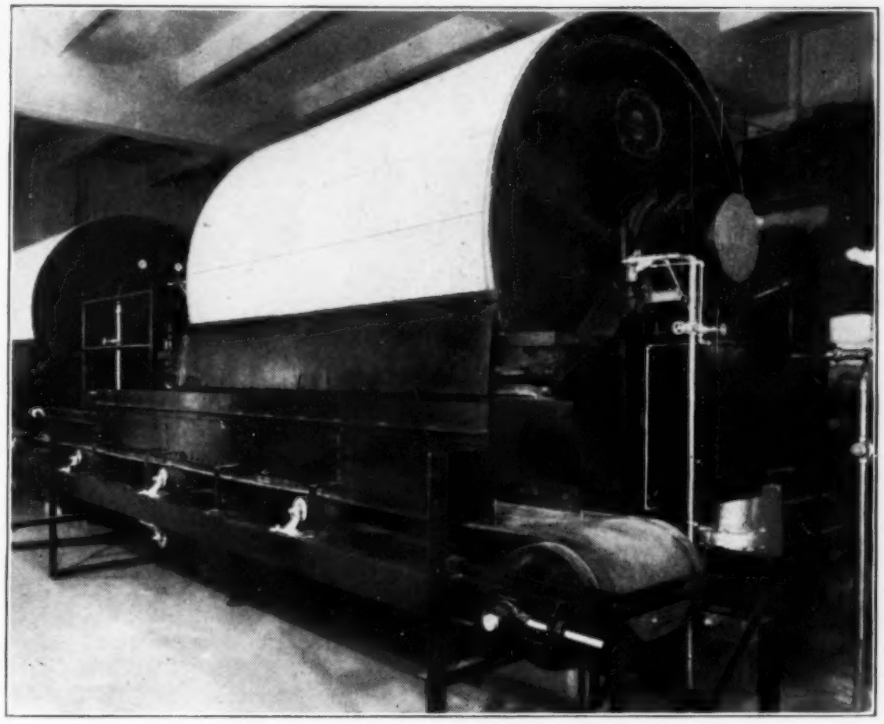
Another problem of activated sludge operation is the rising of sludge in the final settling tanks when denitrification occurs and liberated bubbles of gaseous nitrogen lift a blanket of sludge to the surface before the cleaning mechanism can remove it from the bottom of the tank. This problem is most troublesome where large amounts of nitrogen are present in the sewage from packinghouse wastes, as at Sioux Falls, S. D., where a year's research indicated that nitrates must be held below 5 ppm. or the ammonia completely oxidized to nitrate, up to 50 ppm., in order to prevent rapid sludge rise. The latter limit is too expensive in period and air; inhibition of nitrification by copper sulfate was unsuccessful, as too much was required; chlorination showed promise; other chemicals were ineffective. A mechanism for more rapid removal of sludge from the final



Filter and Incinerator Building—East Chicago, Ind.
(One of the very few new municipal sewage treatment plants of 1945.—Consulting Engineers, Russell B. Moore & Co., Indianapolis, Ind.)

tanks has been installed and will be tested next summer, when the difficulty occurs. The studies brought out the necessity for a program of salvage of wastes, particularly nitrogenous, within the packinghouse, and prevention of peak losses, to lower the nitrogen to B.O.D. ratio.

The maintenance of air diffusion plates in activated sludge plants eventually becomes a problem, sometimes in a few summer months, but more often in from 2 to 15 years. It is desirable to have as fine bubbles as possible in order to promote maximum oxygen absorption from the bubble surfaces, but on the other hand pressure increases of 1.0 lb. or more at the blowers are quite serious and the increased power cost makes it necessary to clean or replace the plates. Early practice was to use plates with ratings of 10 to 20 cu. ft. per sq. ft. per minute at 2 in. water pressure, later up to ratings of 80, and ratings of 40 to 50 as the preferred range. Pressure losses are caused by clogging of the upper or lower surfaces of the diffuser plates, the former by biological growths, the latter mainly by dirt in the air. Top surface clogging can occur the first summer that the plates are used. We had this experience in 1944 at the Southwest T. W. due to a growth of a water mold identified as a species of *Saprolegnia*. This formed a carpet of gray-green hyphae on the plates in the first bays of the aeration tanks and ran the pressure loss up .6 or .7 lb. in a few months. Chlorine, copper naphthenate, mercury salts and other fungicides were useless. Pyridyl mercuric stearate, a recently developed fungicide, showed most promise in the laboratory but not much when applied to the plates in the tanks. With new plates installed in 1945, one row per tank, a ratio of 1 to 30 and rates of 6 to 10 cu. ft. per plate per minute, we expected a recurrence of the difficulty but fortunately it did not recur to any serious degree. The two years were quite different in rainfall, 1944 being exceptionally dry and sewage slightly warmer, industrial activity at its peak and air supply at the Southwest T.W. inadequate.

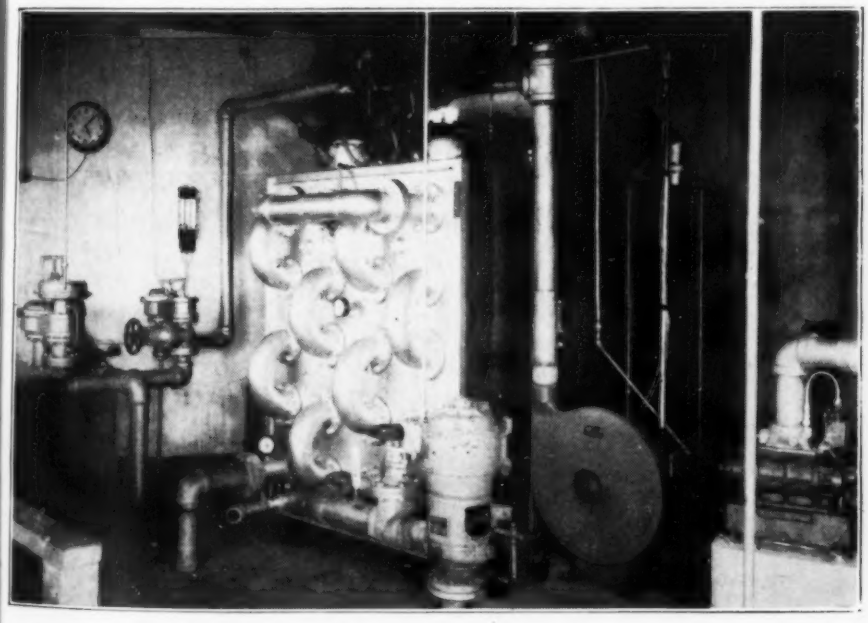


East Chicago, Ind., Vacuum Filter Installations
(8-ft. dia. by 10 ft. face Eimco sludge filters)

Clogging by dirt from below the plates is a slow process that eventually catches up with all ceramic air-diffusion systems. Knowledge is rather general now that cleaning the plates with sulfuric acid and sodium dichromate will temporarily restore permeability, but this is a tedious, objectionable and expensive chore, especially when plates are grouted into fixed containers of precast concrete. Chlorination of the air has been tried three or four times at the Southwest T.W. and has not been of any help.

In order to avoid these troubles, for several years slotted brass pipes have been in use in one of the aeration tanks (each 434 ft. long, four bays each 32 ft. wide). These aerators are relatively free from clogging difficulties but require possibly 40 per cent more air to give the same D.O. in the aeration tanks, because of the coarseness of the bubbles. A slot less than .04 in. wide clogged rapidly. Saran tubing was unsatisfactory.

In order to compare various diffusion media, tanks in Battery A are now equipped with (1) one row of plates, (2) four rows first bay, one in other three, (3) removable plates in cast-iron boxes, designed by Anderson, with rubber gaskets and wedges to permit removal of plates for cleaning, (4) two rows,



1,000,000 Btu. per hr. P. F. T. Digester Heater and Heat Exchanger at Crystal Lake, Ill.

Manville, N. J.—110 ft. Rotary Distributor—R. B. Carter & Co.

(5) four rows, (6) vertical holders, (7) swing diffusers with ceramic tubes and (8) slotted brass pipe. (These installations are shown in accompanying photographs). Studies of D.O., pressure losses, cleaning of air and, later, acid cleaning of removable plates, are under way to determine the type of diffuser for future use. The complexity of the problem is surprising but the magnitude of the project warrants extensive investigation. Similar problems at West Middlesex and Ward's Island have been discussed in 1945.

CHLORINATION

The use of chlorine for improving the sludge index in activated sludge operation has been noted. Chlorine has been used to improve the condition of supernatant liquor before it is retreated, thus buffering shocks to the treatment system. Chlorine control has been improved at Buffalo, where 2.5 tons per day are applied to a settled effluent before discharge into the Niagara River. The improved condition of the downstream water as a source of raw water on the American side of Grand Island has been the subject of a hearing recently.

The Detroit chlorination installation is the largest in the world, with nine solution-feed chlorinators, each with a capacity of 6,000 lb. per day. Chlorine is removed from 16-or 30-ton tank cars as a liquid, and evaporated as a gas from one-ton containers in water-heated tanks. The average amount applied for the year ending June 30, 1944, was 3914 tons, or 10.7 tons per day, averaging 7.85 ppm.

A laboratory investigation of chlorination of sewage and effluents by Griffin and Chamberlain, of the technical service division of Wallace and Tiernan, showed that heavy doses effect B.O.D. reduction, the proportion to break-point being 1.67 lb. B.O.D. per lb. chlorine for activated sludge effluents .33 for settled effluents and 1.02 for raw screened sewage. The last required about 210 ppm. chlorine for raw sewage with a B.O.D. of 546 p.p.m., the settled effluent 125 ppm. chlorine for a B.O.D. of 70 ppm. and 58.6 per cent reduction. With these large quantities of chlorine used, it is obvious that break-point chlorination is not economical for sewage or sewage effluents.

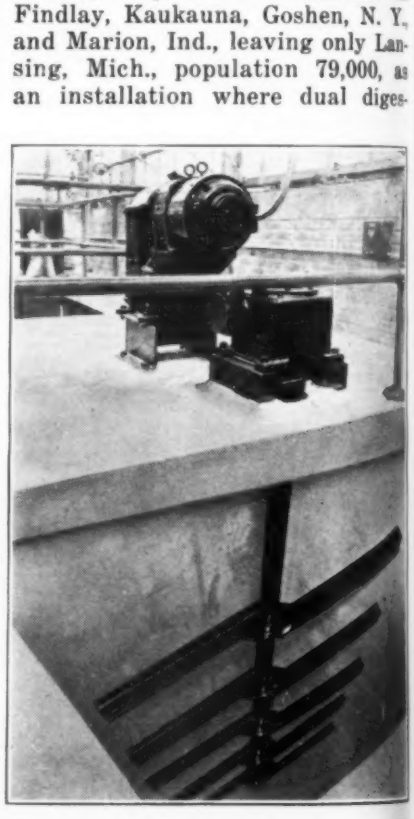
Chlorine as a bactericide was reported by the U.S.P.H.S. to be in use in 1168 sewage treatment plants out of a total of 5610 or 20.8 per cent of all plants, but in population these plants serve 35.5 per cent of the total population provided with sewage treatment. The oriental war has drawn attention to the presence of viruses and parasites in sewage and extensive studies have been made under the direction of the committee on Medical Research of the Office of Scientific Research and Development, the results of which may be released in 1946. Published work by the U.S.P.H.S. has shown that it is the undissociated HO Cl that is effective, not ionized O Cl—. Further data will be of interest.

Infectious hepatitis, a virus infection of the liver causing fever, nausea and temporary jaundice, has been shown to be water-borne. Preliminary research indicates that a residual of 15 ppm. chlorine after 30 minutes, contact resulted in a definite attenuation of the virus, but not disappearance. This led to a question as to whether normal amounts of chlorine and residuals used in water purification may be effective in preventing water-borne epidemics of hepatitis, but it should be pointed out that water should normally be filtered before chlorination; the investigators added soda ash, alum and carbon and removed the floc, thereafter filtering through cotton, in an attempt to simulate filtration. With a residual Cl_2 of 1.0 ppm., two out of five test patients developed a mild case of the disease.

Interest in virus diseases recalls the fear that poliomyelitis virus might survive sewage treatment and normal doses of chlorine, but the latest report and editorial in the *Jour. Am. Med. Soc.* indicates that person-to-person contact infection appears much more plausible than insect-borne transmission from polluted water or sewage, and that many light or unrecognizable cases may transmit the disease in a greater or less degree of virulence.

SLUDGE DISPOSAL

Stage digestion continues to be adopted to lessen the problems of supernatant withdrawal. The sludge is kept homogeneous in the first stage by circulation and overturn once in 24 hours. Addition of ammonium sulfate to digesters to reduce scum formation is under study but as yet results are inconclusive. Dual digestion of garbage and sludge is talked about extensively, but actual installations are few and data meager. No garbage has been added at Gary or Rock Island, only a small amount at Findlay, Kaukauna, Goshen, N. Y., and Marion, Ind., leaving only Lansing, Mich., population 79,000, as an installation where dual diges-



Vertical Type Floccer

(Installed by Ralph B. Carter Co. at Hudson River State Hospital. Runs at speeds of from 2.2 to 8.8 rpm., using vari-speed motor drive.)

tion has been practiced on an extensive scale since 1940. The plant is overloaded and additions are being planned. Ground garbage is added directly to the digesters, not to the sewage. The garbage must be hand-picked for glass, bottle caps and other debris likely to accumulate on the bottom of the digester. Scum production must be watched.

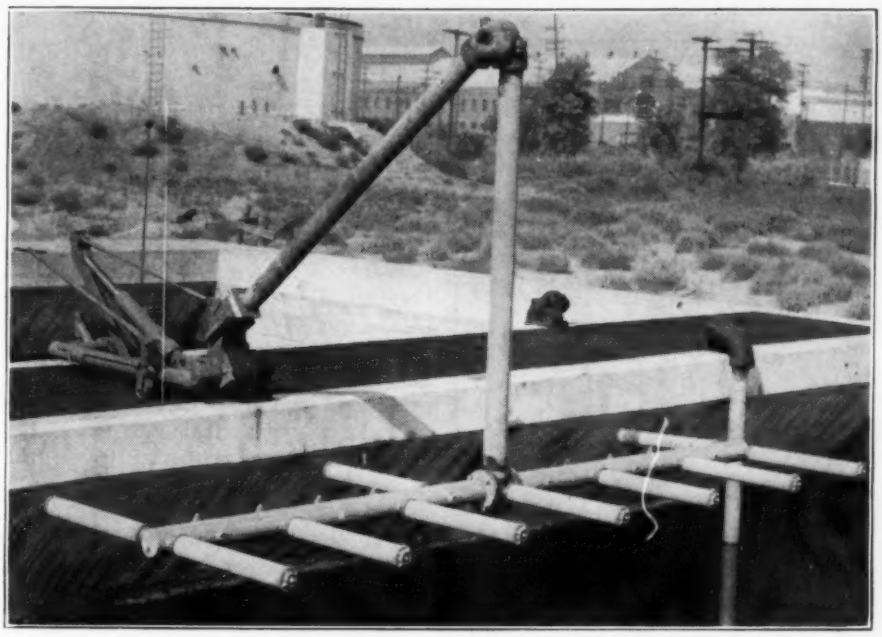
The effect of home garbage grinders on sewage disposal has been studied by Schroepfer for Minneapolis, but the net effect of this increment to sewage solids will probably not be important for some years.

One of the very significant reports of the year on sludge digestion is that by Dr. Fischer on thermophilic digestion. The tests at Jackson deserve more careful consideration, as they eliminated some of the former objections to thermophilic digestion such as odors, sludge hard to dry, caking on hot-water coils and poor supernatant liquor. Preliminary heating of sludge appears practical, possibly even direct flame heating, now being studied at Philadelphia. New types of insulation need to be developed to reduce heat loss. Two stages, thermophilic followed by unheated mesophilic digestion, are necessary. Why is development of thermophilic digestion so slow?

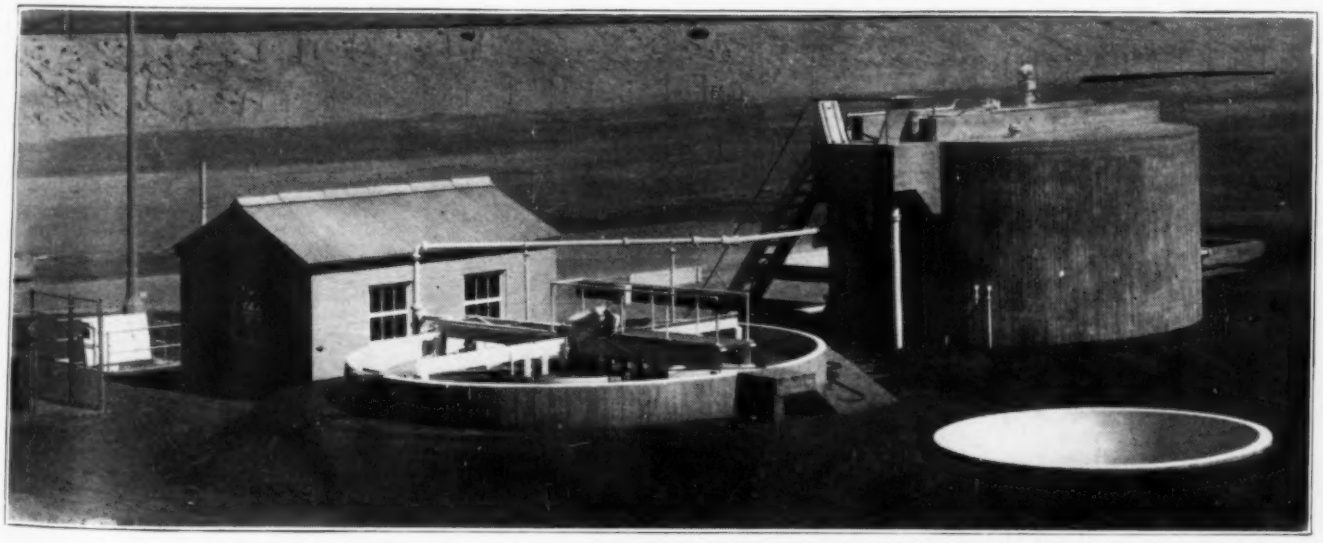
Lagoons are not considered the most desirable type of disposal for sludge, digested or undigested, but as an adjunct to more mechanical, more expensive processes, or even as the sole method of sludge disposal they can be very practical, as they have been at Indianapolis for many years, at Fort Wayne in part and as an auxiliary method of sludge disposal in 80 acres down Des Plaines River below the Southwest T.W. of the S.D.C. Proper seeding is essential, also maintenance and control of overflow of supernatant liquor, averaging less than 200 ppm. B.O.D. and suspended solids. Local odors may develop and their spread must be guarded against.

Dr. Rudolfs has discussed the production of a good supernatant liquor from digestion tanks. He concludes that the quality of the liquor is a function of the loading, which should not exceed 0.1 lb. dry volatile solids per day per cu. ft. of digester capacity in the first stage of a two-stage digestion plant, or less with industrial wastes present. With only one stage, loads as low as .042 lb. per day did not produce clear supernatant liquor.

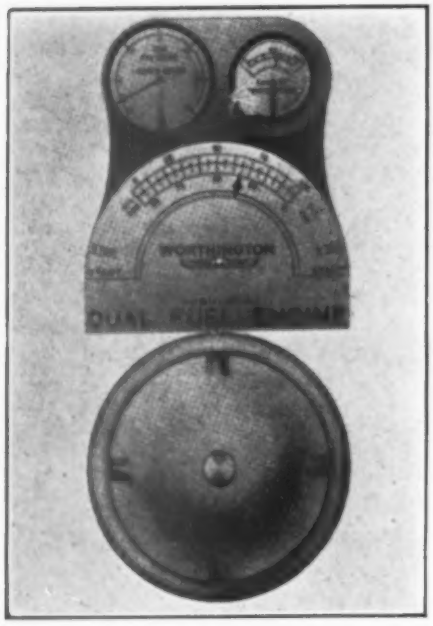
Erickson recommends aeration of supernatant liquor by short open pipes at the surface of the liquor, which is drawn up into the pipes by a slight vacuum set up by a fan, releasing gases and allowing the degassed liquor to drop down into a separator box for removal of settled solids. The discharged liquor was found to contain from 200 to 360 ppm. suspended solids in tests at Cleveland, Geneva, Ill., and Camp



Portable Hydraulically Operated Swing Diffuser Hoist
(Wide band air diffusion system developed by Chicago Pump Co. installed at East Chicago, Ind., sewage treatment plant.)



Primary Sewage Treatment, U. S. Naval Magazine and Net Depot, Anaheim Bay, Cal.
(Equipment includes comminutor, flocculator, chlorinators, digester.)



Selective Fuel Dial for Worthington Dual Fuel Diesel Engines

Shelby. Chamberlain discusses mechanical aeration to accomplish similar results, or the use of an anthracite coal filter.

One of the hazards of digesters is the danger of explosions. Explosions of gas in or from digesters have occurred more frequently recently, as at Fargo, Monroe, Findley, Herkimer and possibly others.

Sludge filtration and drying or incineration continue to be improved but no chemical conditioners have been discovered superior to ferric chloride for activated or elutriated digested sludge, or ferric chloride and lime for undigested or unelutriated sludge. Wright's cord filter is getting a new trial at Perth Amboy, N. J. A remodelled sludge-drying system is showing increased capacity and less maintenance at Chicago.

INDUSTRIAL WASTES

The industrial waste disposal problem has been very active in 1945 because the end of the war and return of many sanitary engineers to state positions has resulted in more insistent demands that industry do something about the abatement of industrial waste pollution of streams, overloading of sewage treatment works, and other consequences of industrial activity that were overlooked during the war. Industrial groups appreciate the urgency of constructive accomplishment in waste disposal and have formed research or investigating committees to learn more about the problem, to study methods of treatment, and if finally unavoidable, to spend money on treatment or disposal.

The Council of the Pulp and Paper Industry started new studies during 1945 at Park Rapids, Wis., Kalamazoo, Mich., New York University, Mellon Institute, Rutgers and Purdue University. Research continues at the Institute of Paper Chemistry at Appleton and at the University of Washington. However, no treatment works are reported for operating paper companies, probably due to war restrictions, but storage ponds, lagoons and stream aeration have been installed and will be studied. De-inking wastes are under study at Mellon Institute and in the Kalamazoo Valley. Surely some good will come out of this research.

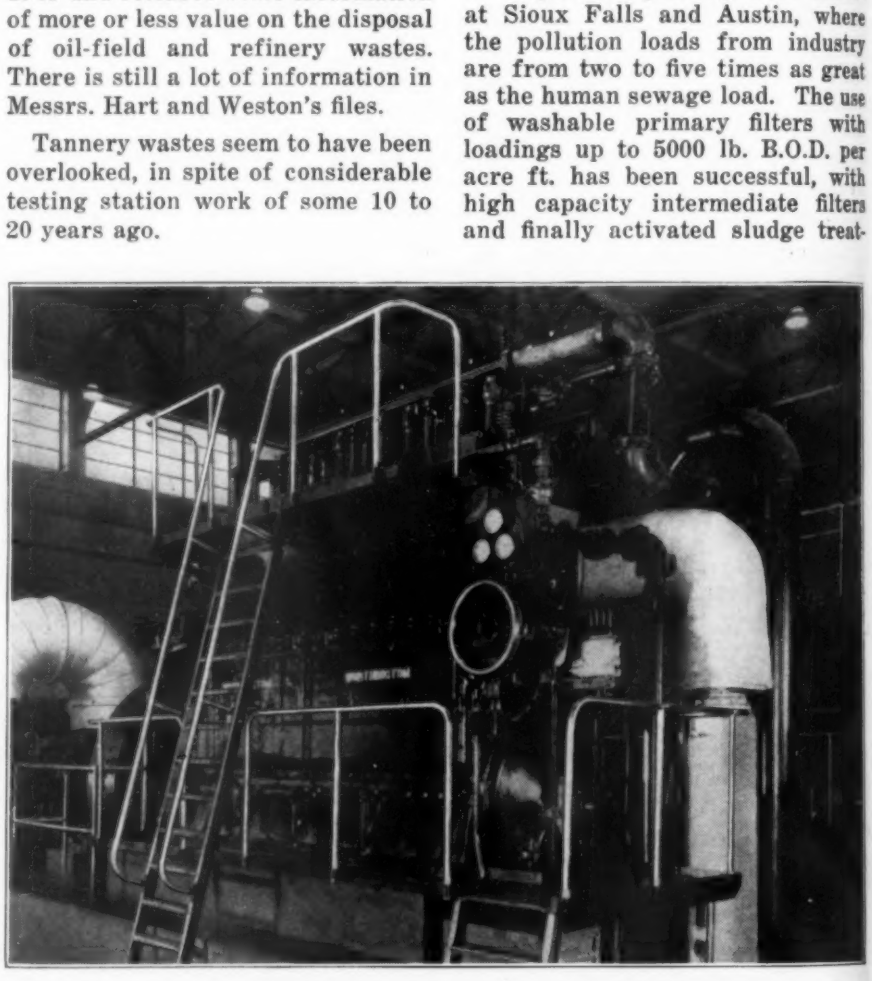
The Iron and Steel Institute has been dormant except for frequent reviews of the many processes proposed and patented for treatment of iron and steel pickling liquor.

The American Petroleum Institute became more informative in 1945 and released some information of more or less value on the disposal of oil-field and refinery wastes. There is still a lot of information in Messrs. Hart and Weston's files.

Tannery wastes seem to have been overlooked, in spite of considerable testing station work of some 10 to 20 years ago.

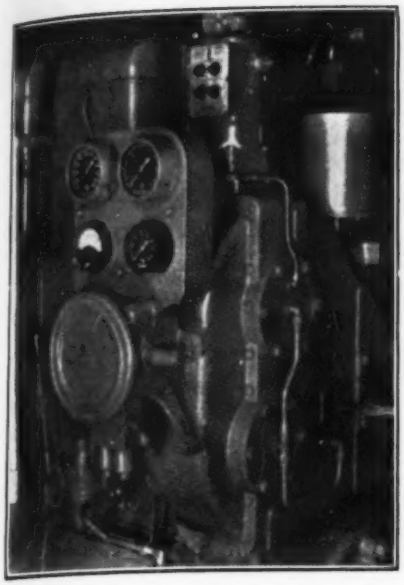
Cannery wastes are ubiquitous and much is written about them. Mr. Sanborn has good ideas on waste disposal and his promotion of the use of sodium nitrate for stabilizing lagooned cannery wastes is helpful. Such studies were made and reported by midwest state health departments, resulting in recommendations that about 20 per cent of the 5-day B.O.D. of the wastes be satisfied by addition of sodium nitrate, in lagoons not more than 5 ft. deep and large enough to hold say 125 per cent of the seasonal volume of waste. About 10 tons of $NaNO_3$ was added to a pea-waste lagoon near Rochester, N. Y., in July, 1944; the B.O.D. rose to 1440 ppm. on Aug. 10th, later declining to 210 ppm. on Sept. 2 and 57 ppm. at the end of October. This procedure seems the best that has been proposed for preventing nuisance and odors from wastes that are seasonal and do not warrant installation of chemical precipitation or filters as developed by Warrick in Wisconsin.

Hill reported interesting results on disposal of packinghouse wastes at Sioux Falls and Austin, where the pollution loads from industry are from two to five times as great as the human sewage load. The use of washable primary filters with loadings up to 5000 lb. B.O.D. per acre ft. has been successful, with high capacity intermediate filters and finally activated sludge treat-



Worthington Dual Fuel Engine at Tallman's Island Sewage Treatment Plant, New York City

(On right is selective fuel dial and pilot-oil pump.)



Control End of New Cooper-Bessemer Dual Fuel Diesel, Showing Gas-Oil Operating Mechanism

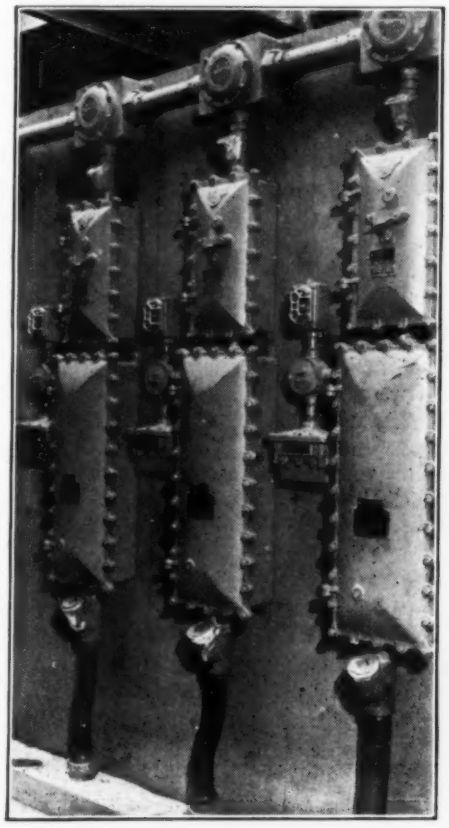
ment, if the rising sludge problem in the final tanks can be licked. Packinghouse engineers are showing renewed interest in grease recovery and installation of increased evaporating capacity for "stick" liquor.

The dairy industry wants to establish research fellowships on disposal of wastes, also brewery engineers are discussing the salvage of grains and yeast by more refined methods. Distillery wastes can be recovered profitably if the "slop" is high enough in solids content, but when under 2.0 per cent, salvage is unprofitable, and only treatment is possible, by anaerobic digestion as at the Standard Brands plant at Pekin or by high-rate biological filtration, not too successful at the National Grain Yeast plant at Crystal Lake. New wastes from penicillin, streptomycin and furfural manufacture are in the distillery waste category and yield more or less to the above types of treatment.

Dr. Symons in an article in *Water Works & Sewerage* (Dec. '45), has explained the basis of rate charges to cover excess cost for treatment of industrial wastes at Buffalo, where only primary treatment is required because of the enormous dilution of the effluent in the Niagara River. Sludge disposal and chlorination charges are included.

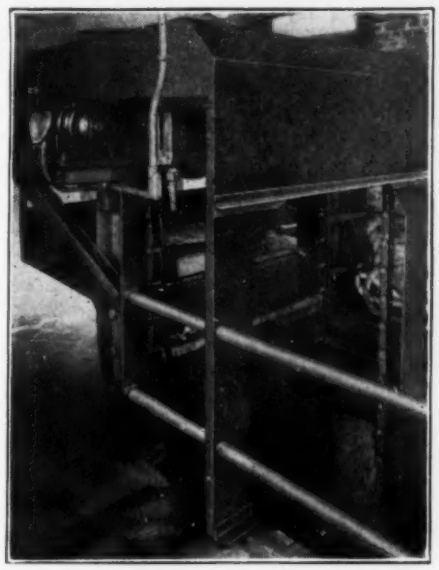
In England the 1937 Trade Wastes Law is being dusted off and some modifications are recommended by various English critics, including a proposal by Mr. John Hurley, now President of the Institute of Sewage Purification, that the control of disposal of industrial wastes be handled by the Government, with the advice of a committee of experts, who would estimate the cost of primary, intermediate and complete treatment of various types of wastes, then levy charges on industry according to the type of treatment provided by the local sewage authority, and reimburse said local authority in accordance with the degree of treatment provided. So far, this is only a suggestion, but one made by a very practical man and one in a position of honor and authority. In the U.S. the tendency is to de-centralize the authority, and to continue to set standards and supervise treatment by state sanitary engineers, with direct contracts or agreements between sewage treatment authorities and individual industries.

Non-ferrous metal wastes are sometimes troublesome, for example copper, chromium, cyanide, plating solutions, and acids. Friel and Wiest installed a plant for disposal of cyanide wastes, using chlorine for formation of cyanogen chloride, C N Cl, which quickly decomposes to harmless ammonium carbonate in the presence of hydroxide alkalinity. Batch treatment was considered most practical, in wooden tanks with 20 to 30 minutes' retention.



Explosion Proof "G-E" Motor Starters With Line Switches and Push Buttons

(Located in a sludge control building at a sewage plant—another innovation, "G-E" special combination magnetic switches for automatically applying low voltage current to motor windings to keep them dry.)



Yeoman's Mechanically Cleaned Bar Screens

Chemical manufacturers are waking up to the waste disposal problem and have formed a committee for consideration of this problem headed by L. L. Hedgepeth of the Penn. Salt Co., a former water and sewage works man, who should be able to stir up proper interest in disposal of wastes from the chemical industry. Dow's phenol removal plant at Midland is well known, also other chemical manufacturers such as Calco, National Aniline and Solvay have gone a good way toward solving their waste problems.

A very interesting meeting was held at Purdue University in November, 1944, devoted to discussion of industrial waste utilization and disposal. A second meeting was held in January, 1946. Special groups discussed particular wastes —packinghouse, refinery, iron and steel, fermentation, cannery and dairy. Many representatives of industry were present and gave as much information as was permitted on types of wastes, salvage and disposal.

LEGISLATION AND LITIGATION

The mounting volume of pollution, both from sewage and industrial wastes, and the resulting pollution of streams and lakes, have led to continuous efforts to pass national laws to cope with the prob-

lem, as expressed by various bills first introduced eight years ago as the Barkley and Mundt Bills. In the 79th Congress the Barkley-Spence and Mundt Bills were still under consideration, with several others as modifications of these two.

The Mundt Bill (HR 519) establishes a new Federal agency, designated as the National Board of Water Pollution Control, with nine members (four Cabinet Members, Surgeon General, two Senators and two Representatives) plus an operating commission of nine members, two from U.S.P.H.S., two from the Corps of Engineers, and the remainder from other government services. This Commission shall make investigations and prepare plans, fix standards and order the required degree of treatment to be installed. If after due time the order is not obeyed, the Attorney General may start suit to enforce compliance. No grants or loans are provided.

The Spence Bill (HR 4070), introduced Sept. 14, 1945, provides for water-pollution control activities in the U. S. Public Health Service, with the Surgeon General supervising investigations, promoting compacts between states, preparing programs of abatement in cooperation with state or regional authorities and recommending grants to public bodies up to 33 per cent of the cost, and loans to industries, such funds to be furnished by the Federal Security Administrator from an annual fund not to exceed $100,000,000, appropriated by Congress. A sum of $1,500,000 would be provided annually and allotted to states for investigations, surveys and studies necessary in the prevention of water pollution.

Most societies, associations and the Sewage Works Federation have endorsed the Spence Bill and sent able representatives to a hearing in Washington on Nov. 13, 1945, before the House Rivers and Harbors Committee. Various proponents of the Mundt Bill were also present and argued their preference. The bills and arguments are now being considered by the Committee, of which Rep. Mansfield is Chairman. It is considered likely that a report will soon be issued, and possibly some bill may be passed by the present Congress. Immediate construction of treatment plants is not urged, in view of the large construction program for private industry and housing, postponed during the war now urgently needed. However, the foundation for large public works expenditures can and should be laid.

Various states have passed laws and established stream pollution boards, such as in Tennessee, the Potomac Watershed, the States of Washington, Indiana, Minnesota and the long-existent Committees in Illinois, Wisconsin, Michigan and other states. Pennsylvania has a drastic program to enforce treatment of sewage and industrial wastes before June 30, 1946, including Philadelphia and Chester, long recalcitrant in efforts to "clean up," as so dramatically described in "Our Dying Rivers" in the October issue of *Reader's Digest*.

Pollution of the southern end of Lake Michigan by industrial wastes and municipal sewage is gradually being abated as the result of a lawsuit in the U. S. Supreme Court brought by the State of Illinois against the State of Indiana, the Calumet cities, and some fourteen industries, mostly iron and steel works and oil refineries. A Master was appointed by the Supreme Court to conduct hearings, but instead of a trial the case has been conducted by investigations, conferences and stipulations which bind the municipalities and industries to carry out specific programs within two to three years, including separation of sanitary sewage and discharge to sewage treatment works. Some of the large industries in this region are the Gary Works of the U. S. Steel Corporation, Inland Steel, Youngstown Sheet and Tube, Socony-Vacuum, Sinclair, Standard Oil of Indiana and the American Maize Company.

Litigation over activated sludge patents draws to a close with an opinion of the U. S. District Court for the Northern District of Illinois, Eastern Division, fixing the compensation to Activated Sludge, Inc., for infringement of patents by The Sanitary District of Chicago. This decision was filed January 26, 1946, by Judge Walter Lindley, who awarded $950,000 to the plaintiffs. The Sanitary District intends to appeal. It will be recalled that in the Milwaukee case, the judgment was $4,900,000 but the final settlement amounted to $818,000.

NEW PROJECTS

Although "Blueprint Now" was the slogan in 1944, "Postpone Public Works" seems to be expedient now when housing, private construction and industrial expansion are begging so eagerly for funds, materials and priorities. Later, after these needs are satisfied, large public works expenditures may be called upon to avert unemployment and depression. This seems more reasonable than undue haste to pile public works construction on top of a staggering load of long overdue private construction. Especially is this true when considering recent contractor bids in comparison with engineers' estimates based on expected reasonable costs.

However, many large projects are nearly ready for construction or are already under way. Urgent programs of many millions' expenditure on sewage works are those at Philadelphia, Toronto, Boston, New York (Hunt's Point and others), The Sanitary District of Chicago, Portland, Ore., Akron, Camden, Los Angeles, Norfolk, Newport News, Miami and Knoxville.

THE YEAR OF PEACE

Although peace came in 1945, most meetings were abandoned because of railroad and hotel congestion. The Federation published a selected program of papers planned for the Fall meeting, and held a meeting of the Board of Directors in Chicago in October, where business affairs of the year were conducted. Plans were made for issuance of a number of monographs, including those dealing with the use of sewage sludge as fertilizer, air diffusion for activated sludge plants, trickling filters, hygienic aspects and sewer ordinances. The first of this series, a monograph on hazards in sewage treatment works, appeared in 1944.

The close of the war just about closed up the Sanitary Corps of the Army, which had taken the cream of the crop of sanitary engineers, chemists and bacteriologists during the war, but did not succeed in becoming an independent service of the Army in spite of the tremendous expansion and acknowledged usefulness of the Corps. It seems to have been relegated to a minor branch of the Medical Department, rather than elevated to a division of the Corps of Engineers. Many sanitary engineers felt that their services were not put to most effective use, such as in the operation and control of sewage treatment works in Army camps or the control of water purification, rather than the inspection type of service and general sanitation services which could have been performed by others than trained engineers.

SANITARY ENGINEERS AND OPERATORS HOLD NEW YORK MEETINGS

A Report on the Meetings of the ASCE San. Engr. Div. and N. Y. State Sewage Works Assn.

By Harry A. Faber*
Editorial Associate

ASCE Chairmen

(Retiring)	(Incoming)
N. T. Veatch	*Geo. J. Schroepfer*
Consulting Engr.	*Prof. San. Eng.*
Black & Veatch	*Univ. Minnesota*
Kansas City, Mo.	*St. Paul, Minn.*

ACCORDING to long established custom, the January meeting of the New York State Sewage Works Association is planned to follow the Sanitary Engineering Division sessions of the American Society of Civil Engineers. The dates of the latter were January 16th and 17th, and the N. Y. Association met on the 18th. Engineers attending the ninety-third annual meeting of their Society and members of the Sewage Works Association, at their eighteenth annual meeting, took advantage of this opportunity to attend both.

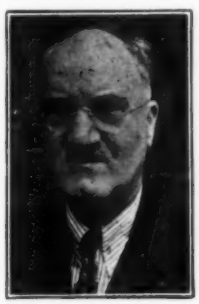
N. T. Veatch, Consulting Engineer, Black and Veatch, Kansas City, Mo., presided at the Sanitary Engineering Division sessions. Several reports of committees were presented on the first day and a wide variety of technical papers, covering water and sewage engineering in the United States and abroad, comprised the program on the second day.

Dr. George E. Symons, Associate Editor, *Water & Sewage Works*, New York, president of the Sewage Works Association, presided at the Association meeting. A registration of 287 members and guests indicated the popularity of the program which was provided.

*Research Chemist, The Chlorine Institute, Inc., New York, N. Y.

PRESENTATION OF AWARDS AT NYSSWA LUNCHEON

C. R. Velzy, Consulting Engineer, chairman of the Kenneth Allen Memorial Award Committee, announced that upon recommendation of the committee, henceforth only one Kenneth Allen award will be made each year to an author of a research paper but a new award will be made to a plant operator whose paper is considered of outstanding calibre. The new award is designated "The Lewis V. Carpenter Award," being named in honor of the deceased professor of sanitary engineering at New York University whose character and contributions will long be remembered in the field of sanitation. First recipient of this new award to be selected was Channel Sampson, Superintendent of Sewage Treatment, Tonawanda, N. Y., for his paper describing recent additions to the sewage treatment plant. Because of a scarcity of outstanding research papers, no recipient of the Kenneth Allen award was named by the committee.



ASCE Award Winners

Thos. R. Camp	*Langdon Pearse*
Consulting Engineer	*Chief San. Engr. Sanitary Distr. Chicago*
Boston, Mass.	*(Herring Medal)*
(Stevens Award)	

E. C. La Valley, State Dept. of Health, Ithaca, N. Y., chairman of the Association's Rating Award Committee, announced that 1945 marked the tenth year in which this award has been made for annual reports. Harry M. Monsell, Supt. of Sewage Treatment, Greenport, N. Y., was named to receive the award for the report on plant operation judged best of all those reports submitted to the rating committee.

NYSSWA Presidents

(Incoming)	(Retiring)
Uhl T. Mann	*Dr. Geo. E. Symons*
Chief Operator	*Associate Editor*
Ley Creek Plant	*"Water & Sewage Works"*
Syracuse, N. Y.	*New York*

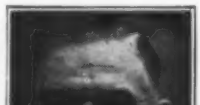
Ed. J. Smith, Supt. of Sewage Treatment, Niagara Falls, N. Y., received the rating award for the best report submitted by a previous winner of the Rating Award Cup.

Dr. Lloyd R. Setter, Prin. San. Chemist, Dept. of Public Works, New York City, received the Harrison Prescott Eddy Award of the Federation of Sewage Works Associations for his outstanding research contributing to processes of sewage purification in particular for his papers on modified sewage aeration.

Uhl T. Mann, Chief Operator, Ley Creek Sewage Treatment Plant, Syracuse, N. Y., incoming president of the Association, presented Dr. George E. Symons, retiring president, with a key. Guests at the luncheon included a full complement of officers of the Federation of Sewage Works Associations: Adm. J. K. Hoskins, President; F. S. Friel, Vice-President; and W. H. Wisely, Exec. Sect. Colonel W. H. Hardenbergh, just retired from active service directing the Sanitary Corps of the U. S. Army, was welcomed.

Mr. Wisely spoke briefly with respect to recent progress made by

the Federation and brought members news concerning plans for what promises to be the best year in the Federation's history to date.



ASCE Executive Comm. Members

Ray F. Goudey
Chief San. Engr.
Dept. of Water
Los Angeles

Earnest Boyce
Prof. San. Eng.
Univ. Michigan
Ann Arbor

Improvements are to be made in the Journal, beginning with the January number, new manuals will soon be issued, and a glossary of terminology is in preparation. Mr. Wisely urged the New York group to compete for prizes which will be given by the Federation to that Association showing: (1) the greatest total increase in members, (2) the greatest percentage increase. The 1946 convention will be held in Toronto.

Luncheon Speaker on Cooperative Sanitation in the Americas

Guest speaker at the Association luncheon was Colonel Harold B. Gotaas, President, Institute of Inter-American Affairs, Washington, D. C., whose paper, "Cooperative Sanitation in the Americas," described progress made during the last four years between 19 countries of this hemisphere. The health and sanitation program of the Institute is considered basic to industrial developments and, as a tool to combat activities of anti-American groups, is integrated with the good-neighbor policy. Originally, most of the cost of the work was contributed by the United States, but now the major contributions are from other countries. Attempts are made to introduce North American standards of design and to use health as a rallying-point for bringing peoples of the Americas closer to the United States. Colonel Gotaas employed excellent motion pictures to reveal the great contrasts existing in various countries and to show some of the progress which has been made in sanitation.

Sewage Works Association Officers Elected

The following officers were elected to serve during the coming year:

President

Uhl T. Mann, Supt., Ley Creek Sewage Treatment Plant, Syracuse, N. Y.

Vice-President

Alexander G. Martin, Chair. Public Works Commission, Town of Tonawanda, N. Y.

Secretary-Treasurer

A. S. Bedell, Division of Sanitation, State Dept. of Health, Albany, N. Y.

Assistant Treasurer

J. C. Brigham, State Dept. of Health, Albany.

Assistant Secretary

A. W. Eustance, State Dept. of Health, Middletown, N. Y.

ASCE SANITARY ENGINEERING DIVISION SESSIONS

The Sanitary Engineering Div. of the Am. Society of Civil Engineers held three full sessions during the Annual Meeting.

Two Div. Members Win Awards

On Wednesday, Jan. 16, two members of the Sanitary Engineering Div. were the recipients of Society awards.

Langdon Pearse, Chief Sanitary Engr. of the Chicago Sanitary Distr., was awarded **The Rudolf Herring Medal** in recognition of his services as chairman of the Division's Committee on Sewerage and Sewage Treatment which presents pithy reports reviewing progress, developments and trends in sewerage and sewage treatment.

Thomas R. Camp, Consulting Engineer of Boston, was the recipient of **The J. C. Stevens Award** for his discussion of Paper No. 2218—"Effects of Turbulence on Sedimentation."

Committee Reports

The first session of the Sanitary Division was devoted solely to the presentation of committee reports.

Committee on Organization, Financing and Administration of Sanitary Districts—S. A. Greeley, Chairman.

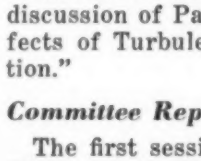
In the absence of the chairman this report was presented by committee member George E. Barnes of Cleveland, who explained that the work of the committee had suffered as the result of the war and plead for cooperation in the collection of information required.

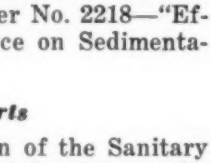
Mr. Benson, a St. Paul Commissioner, told of the success of the sewer rental plant for financing the Twin Cities Treatment Works. With a combination of 1 mill real estate tax and quarterly service charges, based on monthly water meter readings, the bonds can now be retired and there will still be $1,000,000 in reserve. Fact is sewer rental had been abated for a 6-month period and more recently for 1 month. There had been no objections to the sewer service charge in St. Paul, even though the rate had proved to be higher than necessary.

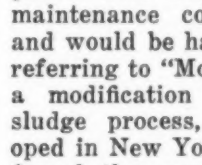
Committee on Sewerage and Sewage Treatment — Langdon Pearse, Chairman.

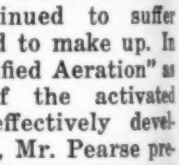
In the absence of Mr. Pearse, who had suffered an accident, the committee report in abstract was presented by Wellington Donaldson, committee member.

The report called attention to the postponed construction program in the sewage field as the result of high demand for construction materials and high labor costs at present. Grease recovery from sewage was still active especially in New York and Racine, Wis., where good prices were being received. Plant maintenance continued to suffer and would be hard to make up. In referring to "Modified Aeration" as a modification of the activated sludge process, effectively developed in New York, Mr. Pearse preferred the more descriptive term "High Rate Activated Sludge" be-









ASCE Programmers

L. R. Howson
Consulting
Engineer
Chicago

W. W. De Berard
City
Engineer
Chicago

J. R. Hoffert
Asst. Chief Engr.
Pa. Dept. Health
Harrisburg, Pa.

Karl R. Kennison
Chief Engr.
Met. Water Supply
Boston, Mass.

cause it is just that with its economical short aeration period. Among its advantages is a more concentrated sludge and less digester cooling as disturbance. In sludge balking control the method of long period aeration of digested sludge and return to the aeration units such as developed at Peoria, Ill., was cited. The value of return sludge chlorination had not been sufficiently demonstrated. In sludge dewatering ferric chloride had been hard to get and elutriation of sludge was proving of value in reducing chemical costs. More sludge concentration with chemicals had been practiced. The vacuum filter is still in the development stages. Chlorination has continued to hold its general position. As to chemical precipitation, which returned to popularity a few years ago, of the 190 plants equipped for chemical precipitation only a few are practicing it. Concerning financing of plant operations, the report cites the method of charging by the city for industrial waste treatment such as that of Buffalo and New Brunswick, N. J., based on solids content and chlorine demand of the waste. In regard to use of sludge as a fertilizer, the report referred to the forthcoming manual of the Sewage Works Federation which will be devoted wholly to the problem.

Secy.-Treas.
Arthur S. Bedell
Chief of Bureau
State Dept. Hlth.
Albany, N. Y.

Fed. Director
Edw. J. Smith
Supt.
Sewage Works
Niagara Falls, N.Y.

Presentation of Awards

Plant Rating Award to Greenport, L. I. Arthur Dawson, operator, acting for Harry Monsell, Plant Supt., receiving the award.

L. V. Carpenter Award to Channel Samson, Supt., Tonawanda plant, for best operator's paper of the year. This new award is being presented by C. R. Velzy, Awards Comm. Chairman.

Plant Rating Award to Niagara Falls, N. Y. Ed. Smith, Plant Supt., receiving the award from E. C. La Valley, Chairman, Rating Award Comm.

H. P. Eddy Award to Dr. Lloyd K. Setter of New York City for his paper on "Modified Aeration." W. H. Wisely, Exec. Secy. of the Sewage Wks. Federation, delivered this award.

Luncheon Session During Making of Awards Amongst the 287 attending we recognize "Bill" Raisch, Prof. Velz, "Al" Genter, Harry Faber and "Art" Clark at near table.

At this point Manley Ross of the Du Pont Co. described the new method of "pickling" steel with sodium hydride which reduces rust and takes place of sulphuric acid. The steel sheets are immersed in a molten bath of the caustic soda and sodium hydride which is gradually converted to caustic soda.

Committee on Evaluation of Professional Objectives in the Design of Sanitary Engineering Works.—Thos. R. Camp, Chairman.

This committee was established for the purpose of evaluating professional objectives in the design of water and sewage works, with particular reference to the influences of proprietary equipment and processes upon the development of effective and economical plans that will best meet the needs of the community or industry served.

Chairman Camp and his committee developed a splendid anaylsis of the situation with which it had to deal and presented what one might term a flawless report with its discussion of the situation existing in respect to employment of patented equipment and processes, the good and dangerous aspects and the ethical and safe procedures for the designing engineer and purveyors of equipment and processes to follow. The report points out the necessity of employing new equipment and processes regardless of the patent angle, since not to do so would be to deny the public the right to all new developments. Engineers must realize that patenting is a necessary protection, if also a seeming racket in some instances. The only right actually granted by a patent is the right to bring suit against infringers. Only in such event can the patent be proven meritorious or valueless. The committee is of the opinion that engineers should recognize and honor patents until there appears unmistakable evidence that the patent is not valid. It is therefore the duty of engineers not to condone or support patent infringement by political agencies or others unless on very certain grounds it appears that a court test is desirable for the protection of the public. When there is any likelihood that the client may be sued for patent infringement the client should be guided by the engineer and the responsibility should not be that of the contractor but should be assumed by the user of the equipment or process.

Principal Speaker
Col. H. B. Gotaas
President
Institute of
Inter-Am. Affairs
Washington

Federation President
Adm. J. K. Hoskins
Chief
Sanitary Eng. Div.
USPHS
Washington

There is considerably more to this report than we can possibly attempt to cover in this digest. The report is available from ASCE headquarters in printed form

In the discussion it was brought out that in patent history to date only about 25% of patents reaching the all important court test had been proven valid.

Committee on Advancement of Sanitary Engineering—Gordon M. Fair, Chairman.

Professor Fair reported that the war had resulted in only about 105 sanitary engineer graduates in the past 5 year period, resulting in almost a 5 year deficiency in sanitary engineers. The committee feels that because of the variety of knowledge required, a sanitary engineer should receive not less than a 5 year course.

Reviewing the opportunity for

young sanitary engineers, the report calls attention to the increasing interest in the public health enterprise, the almost certain occurrence of a nationwide campaign and legislation against stream pollution and the increasing recognition of the value of sanitary engineers in the industrial field.

Prof. Fair pointed to the sad status of the Sanitary Corps, which should be maintained at a strength of 475 engineers in peace time, but which was being merged with the Medical Service Corps. Also it was pointed out that no sanitary engineer's grade in the U. S. Army would be higher than major rank—a critical situation.

The Committee recommended a resolution which was voted by the Division requesting the Board of Directors of ASCE to take some positive action to prevent submersion of the Sanitary Corps into the Medical Service Corps.

The Sanitary Engineering Division also passed a resolution recommending that the Board of Direction of ASCE support in principle the provision of H.R. 4070 and that it disapprove the concept of federal control and jurisdictional authority contained in the bills H.R. 519 and H.R. 587.

(The above report on ASCE committee reports was written by the Editor and inserted in Mr. Faber's report.)

ASCE TECHNICAL SESSIONS

Philadelphia Plans

"Plans for Water System Improvements at Philadelphia," by **Eugene A. Hardin,** Proj. Engr., Bureau of Water, Dept. of Public Works, Philadelphia, Pa.

Among the immediately necessary improvements, outlined by an engineering report in 1940, Mr. Hardin noted that there is to be complete provision of modern chemical treatment for water conditioning and new rapid sand filters at each of Philadelphia's three plants, and that the present slow sand filter units are to be retained as polishing filters. Improved water pumping equipment and revamping of the distribution system are contemplated for increasing efficiency. While the water works staff organized specifically for this program had contemplated its completion by 1943, everything except absolutely essential work was deferred during the war. Contracts for over eleven million dollars of construction are now ready for bids, and still further work to total another ten million dollars is under design. Engineering consultants are now evaluating various raw water sources and will provide a report during the present year.

Chicago's New Plant

"Chicago's South District Water Filtration Plant," by **W. W. DeBerard,** City Engineer, Bureau of Engineering, Dept. of Public Works, Chicago, Ill.

Mr. DeBerard's paper was devoted largely to a description of the initial operation of this plant, beginning late in 1945. Because of the heavy increase in pollution of Lake Michigan from the Calumet area, partial treatment by coagulation, sedimentation, and chlorination, became essential. It is hoped that filter units can be completed by the end of 1946 since activated carbon cannot be employed until these units are in operation. Eventually the present shore intake will be extended to Dunne Crib so that either can be used for the source of raw water.

The plant is arranged in three parallel units, each being provided with two alum feeders. Eleven of fourteen chlorinators are in operation in the plant and residual chlorine tests are made hourly or even more frequently. A chlorine dose of 15 to 20 pounds per mil. gal. is required to yield the desired 5 lb. per mil. gal. residual. Starch-iodide titrations are employed for accurate testing. Three automatic residual chlorine recorders are to be included in the plant, and four others in the distribution system.

The plant staff of 100, which will be enlarged to 145 in the future, is divided into two groups: technical and official employees in one, and mechanical and laborers in the second. Two separate laboratories are provided, for plant control and for research. Mr. DeBerard reported that results are already approaching 90 per cent improvement in taste and odor reduction and that the removal of coliform organisms is always complete.

Future Cost of Engineering Work

"Probable Future Costs of Sanitary Engineering Work in the Light of Increased Labor Costs and the Effect of Increased Costs on Existing Future Budgets for Such Work," by **L. R. Howson,** Alvord, Burdick, and Howson, Cons. Engrs., Chicago, Ill.

Illustrating graphically how the volume of construction is influenced by costs, Mr. Howson predicted that rising prices will materially retard construction and much public work will be deferred or abandoned. The record shows that a price rise always follows a war, but the present rise started in 1935. By 1950, it is estimated that construction costs will be 50 per cent above the 1940 levels; and, in certain types of work such as the installation of water mains and sewers, which involve a large proportion of hand labor, the increase may be even greater.

Delays in letting contracts were attributed by Mr. Howson to: Rising costs of labor, uncertainty of Federal policies, and to congestion in the offices of designing engineers. He advised engineers to be realistic, since there are no indications that reductions will occur within the next decade. While some two billion dollars of water and sewage improvements are projected, no large proportions will be undertaken on the basis of 1940 cost estimates.

DDT to Control Insects

"The Use of DDT in the Control of Insect-Carriers of Disease," by **F. C. Bishop,** Asst. Chief, Bur. of Ent. and Plant Quarantine, Agr. Research Admin., U. S. D. A., Washington, D. C.

Mr. Bishop brought authoritative information as to the uses and limitations of this popular new insecticide. While potent for its intended purpose, the level of toxicity for humans is low. It is not irritating to skin, nor is it readily absorbed, but is toxic if large quantities are ingested. It is toxic to fish and to desirable insects but, properly applied, it appears to be less toxic to honey bees than other insecticides. DDT is expected to solve the malaria problem, yet it does not conflict with the need for water and sewage treatment.

Boston's Sewage Works

"Proposed Sewage Works for the South Metropolitan District in Boston," by **Karl R. Kennison,** Chief Engineer, Metropolitan Dist. Water Supply Comm., Boston, Mass.

By means of lantern slides, Mr. Kennison described outstanding features of the South District plant which will be the first to be put under construction by the city. Treated effluent will discharge to the ocean, but grease removal is particularly important. The plant will provide 30 minutes' detention in preaeration units at normal sewage flow and 0.1 cu. ft. of air per gal. will be applied. Settling units

will give about 1.5 hours minimum detention time. Sludge will be removed to heated digesters and the sludge gas will produce sufficient electricity for all power requirements. Digested sludge is to be discharged with sewage effluent, through a long pipe line, at low tide. An existing screen building is to be remodeled for storage of one-ton chlorine containers; and four chlorinators, each of three ton per 24 hour capacity, will be included to treat up to 112 mgd. flow.

STATUS OF SEWAGE AND WATER IN GERMANY

A civilian specialist group was sent to Germany late in 1945 under the sponsorship of the Foreign Economic Administration to investigate the advances in sanitary practices made in that country. This group included Dr. A. J. Fischer, the Dorr Co.; A. E. Gorman, War Production Board; A. V. Sheridan, Commissioner of Public Works of the Bronx, N. Y.; and Lt. Col. Joseph Gilbert of the Army Sanitary Corps. In a tour of two months' duration, some 60 water, sewage, and industrial waste treatment plants were visited.

Dr. Fischer described the status of sewage and waste treatment processes in two addresses, one before the Sanitary Engineering Division and one before the Sewage Works Association.

As far as could be determined, Dr. Fischer reported, German sewage and waste treatment practice is lagging far behind progress in the United States; there are no new developments, and plants are invariably in poor condition. Of 25 municipal treatment plants visited, only four were in normal operation. Five were considerably damaged by bombing, but others were little affected. There are no large activated sludge plants, but Dr. Karl Imhoff is designing a plant to utilize this process in treating the sewage from a population of 1.3 million in Berlin.

New Vice-Pres.
"Al" G. Martin
Commissioner
Public Works

Awardee*
Channel Samson
Supt.
Treatment Works

Town of Tonawanda, N. Y.

*(*Recipient of the first Lewis V. Carpenter Memorial Award for the best operator's paper of the year.)*

Sewage treatment plants seemed to be operated principally for the purpose of utilizing digester gas to drive motor vehicles. The gas was commonly compressed in two stages to 14 atmospheres pressure, washed to remove carbon dioxide, and further compressed to 350 atmospheres. Gas was used by consumers at 200 atmospheres pressure in cylinders holding up to 560 cu. ft. About 135 cu. ft. of this gas, which contains 90 to 94 per cent methane, is equal at atmospheric pressure to one U. S. gallon of gasoline. The over-all cost of producing such gas would be equivalent to a cost of about 30 to 50 cents per gallon for gasoline.

Mr. Gorman reported on visits to fourteen municipal water works and four large industrial water supplies. While operating under difficulties, engineers and plant operators are cleaning up damage and managing to provide the per capita consumption of 40 to 60 gal. per day. About 75 per cent of the supplies use wells or infiltration galleries for the source of raw water. Open slow sand filters were bombed at one plant, but damage is principally to transmission lines. Standby equipment was more commonly provided than is the case in the United States.

Underground reservoirs, found to be lined with tile and well lighted, were unusually impressive. In the newer water plants, units were

Record Annual NYSSWA Luncheon—Attended by 287 of the 325 Registrants

(By use of a telescope pointed at the head table one may locate in the "driver's seat" President "Doc" Symons, flanked by Admiral Hoskins and Col. Gotaas, the latter wearing the badge of the "Order of the Condor" on his beribboned front, along with other decorations and service ribbons.)

widely separated and located in farmhouse-like buildings for the purpose of camouflage. The identification of underground valves and utilities in city streets is accomplished by characteristic signs on buildings.

NYSSWA Programmers

Dr. A. J. Fischer, Development Engr., The Dorr Co., New York

Thos. M. Riddick, Consulting Engr. and Chemist, New York

H. O. Johnson, Supt., Belgrave Sew. Dist., Great Neck, L. I.

Robt. C. Merz, District Mgr., Chain-Belt Co., N. Y. City

Damaged water systems are already being repaired and sewage plants and sewer systems will be, but the outlook for new construction is not considered very bright by the speakers. Considering the widespread property destruction which exists, it is questionable whether any new sewage treatment plants will be built in Germany for a long time.

Standardized Plans

"Standardized Plans for Sewage Disposal," by **J. R. Hoffert,** Asst. Chief Engr., Pennsylvania State Dept. of Health, Harrisburg, Pa.

Mr. Hoffert offered very practical comment on the question which may readily be answered by engineers but which is quite mysterious to the public. State Health Department officials are frequently asked why standardized plans, which require only minor modifications to be used for any community of suitable size, cannot be made available. In fact, as Mr. Hoffert pointed out, public pressure for standardized plans may become greater than anticipated unless the engineering profession makes an effort to explain this matter. He quoted examples of situations in which it became necessary to provide detailed evidence through a survey of nationally known engineering firms.

In summarizing the reasons why such plans are impractical, it was noted that: the cost of sewers is usually 50 to 60 per cent of the construction cost; plant sites are individual in nature; advances in construction and treatment methods would be discouraged; plans would frequently be given to unqualified contractors; and standardized plans might require such extensive and expensive alterations that the cost of construction might actually be increased up to 25 per cent.

TREATMENT PROCESSES DISCUSSED AT NYSSWA SESSION

Plain Aeration

"Air Flocculation of Sewage," by **Uhl T. Mann,** Supt., Ley Creek Sewage Treatment Plant, Syracuse, N. Y.

For a six-month period Mr. Mann studied the operation of one-half of his plant using the plain aeration process and compared results with the other half in which the activated sludge process was employed. He concluded that plain aeration treatment provided a degree of treatment between primary and secondary processes and offered certain advantages but was not a substitute for the activated sludge process.

The plant is designed for a population load of 30,000 and is somewhat overloaded. In plain aeration treatment, the final effluent lacked the clarity and degree of B.O.D. removal accomplished by activated sludge, but the removals accomplished were more uniform in the plain aeration process. While removals up to 90 per cent in both B.O.D. and suspended solids were attained, the residual B.O.D. value was usually in the range of 20 to 30 ppm.

The sludge resulting from plain aeration was more compact than activated sludge—an important consideration at Syracuse, where sludge bed capacity is at a premium during winter weather. The maximum economical removal of oxygen demand and solids was accomplished in 6 to 7 hours.

In discussing this paper, **Dr. L. R. Setter** described similar tests made at the Wards Island, New York City, plant indicating that compact sludge can be produced by a modified aeration process which also produces a better effluent than the plain aeration process. Modified aeration may be only slightly higher in cost than plain aeration.

Suspended Solids Removal

"Solids Removal as Influenced by Sewage Treatment Plant Design," by **Thomas Riddick,** Cons. Eng., New York City, and **H. O. Johnson,** Supt. of Sewage Treatment, Belgrave Sewer District, Great Neck, L. I.

In a critical review of plant procedures, the authors examined sewage characteristics and sewage plant design with reference to the quality of effluent which can be produced. It is their opinion that the sewage and the treatment plant process must be integrated for best results.

Mr. Riddick, who read the paper, evaluated such important factors as sampling procedures, operating records, types of influent flumes, clarifier design, the value of flocculators, and design of sedimentation basins. He said "the percentage reduction figure is a snare and a delusion," since this value does not disclose plant efficiency. As a practical basis of comparison, the actual organic load imposed by a treatment plant on the receiving stream was suggested.

Grit Removal

"Grit Collection and Conditioning," by **R. C. Merz,** Sanitary Engineer, Chain Belt Co., Milwaukee, Wisc.

Mr. Merz presented a comprehensive discussion of grit chamber and equipment design. He stressed the importance and difficulty of designing grit chambers so that the maximum amount of grit can be collected while, at the same time, collecting the minimum amount of organic matter. No matter how efficiently designed grit chambers may be, at low sewage flows it is impossible to settle grit without also collecting organic matter.

The author described studies leading to the design of grit conditioning equipment in which washing is accomplished by returning settled grit and organic matter to the inlet end of the chamber. This equipment was developed at the Racine, Wisc., sewage treatment plant and is producing excellent results in eighteen installations—all of which report considerable reductions in putrescible material.

A LONG SEWAGE FORCE MAIN

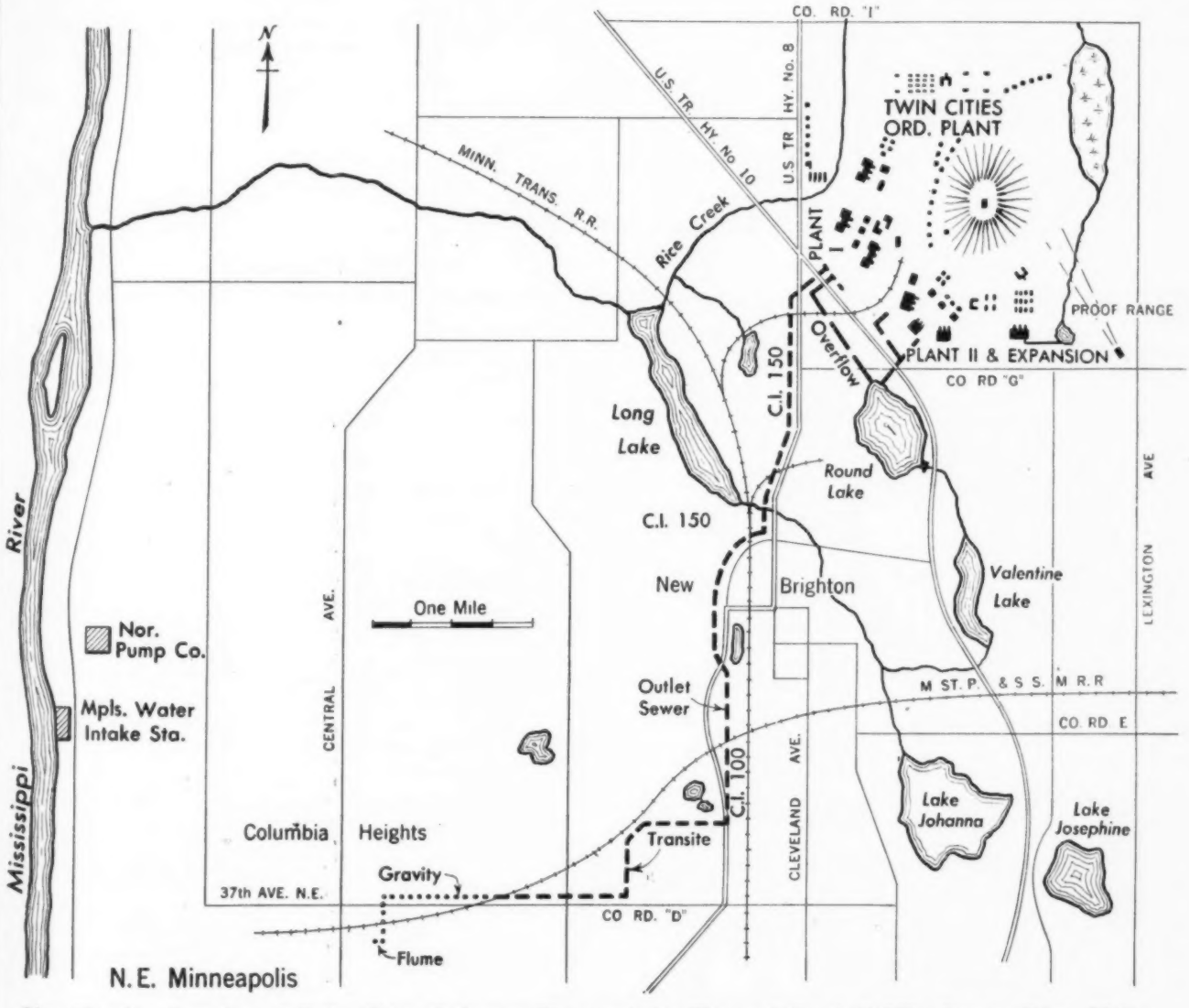
By A. C. WHITNEY*
Supervisor
WATER, SEWER AND DRAINAGE DEPT.
TWIN CITY ORDNANCE PLANT, MINN.

WHEN the Ordnance Plant site, north of the Twin Cities, was selected, certain topographic features became of interest. The flat westerly third of this area was dusted over with dune sand, misleadingly thick along the highway. From a passing motor car the casual observer would have supposed, as many did, that this site was entirely sandy like the outwash plain extending to the northwest or its bordering dune sand margin. A careful inspection, however, disclosed beneath a scanty camouflage of sand, a bed of peat and black rubbery clay. This westerly part of the Ordnance site designated for the manufacturing area was in fact an old lake bed or its equivalent. Tractors grading the peaty clay would sag but not break through and would be continuously climbing uphill as they progressed across the rubbery blanket. Obviously pipe laying in such soil would be troublesome. Tough as the soil condition was, the sewers and ditches have drained it well and now the ground is dry and stable.

Bordering this flat lake bed along its eastern side, rising two hundred feet and separating the manufacturing from the proof range area, is a hill or ridge considered to be a kame. The high point of the county, it proved an ideal reservoir site, a vantage spot from which to watch construction and an invaluable borrow pit for grading and backfill material. The former owner of the kame considered it to be a veritable gold mine of gravel. There was some gravel but it was mostly sand, somewhat cross-bedded and giving a clue to its origin.

Extending toward the cities from the kame lay typical morainic country; moderately hilly with scattered lakes and ponds. That small part on the Ordnance area became the site of plant expansion and known as "Plant II Area" as distinguished

*Colonel, Corps of Engineers Reserve.



Map Showing Location of Twin Cities Ordnance Plant and the Five and One-half Mile Sewage Force Main.
(Sewage is discharged into the Minneapolis-St. Paul Sewer System)

from "Plant I Area" on the old lake bed.

Where to Dispose the Waste?

One creek in particular, of the legion of Rice Creeks, crossed the Plant I Area from north to southwest offering tempting opportunity for waste water disposal. For drainage of storm and ground water it served, but for process water no, as unfortunately the creek debauched the Mississippi River above the Minneapolis Water Works intake. It was soon learned that Rice Creek was an object of great solicitude to the water works and to the Sanitary Division of the State Board of Health.

A small arms plant uses large amounts of water in its brass drawing, pickling, washing, air-conditioning and other operations. Disposition of this process waste as well as the sanitary sewage of a population of several thousand posed a problem to be solved before munitions could be made. A sewage treatment plant, however safe its affluent might be, was frowned on by the Board of Health. For sundry reasons the citizens of Minneapolis are overly sewer conscious and it was not beyond the bounds of possibility that a Saint Paul newspaper might some time innocently observe that the Ordnance Plant sewage effluent flowed into Minneapolis drinking water.

A few years previously Minneapolis and Saint Paul, combining to curb pollution of the Mississippi River, constructed an interceptor trunk to carry sewage of both cities to a treatment plant built below Saint Paul. The nearest point at which the Ordnance Plant could join this system was in northeast Minneapolis and to such junction point it was determined to lay an outfall sewer. Five and a half miles of force main would be required going over eight summits, the highest ninety-one feet above the pumps. From the last summit two-thirds of a mile of gravity line would conduct the sewage to the Minneapolis system. The location of the plant and force main is shown in the accompanying map.

The Sewage Force Line

The State Board of Health wanted a double line, the designing engineers a single one of ample size, though no one anticipated, at that time, the more than doubling in size of the Ordnance Plant. But material was hard to get and Minnesota winter was at hand.

A single main of eighteen-inch Transite and cast iron was the decision, the gravity end to be of twenty-one inch vitrified except under two crossings of the Soo R. R. Line. Plans were drawn, material ordered and excavation for the Parshall measuring flume commenced. Vitrified pipe was available and suitable cast iron for the shorter crossing at right angles to the railroad. Neither iron nor steel could be obtained for the longer diagonal crossing. The vitrified pipe then was threaded through a thirty-six inch corrugated culvert pipe and the ends sealed with concrete collars. The profile of the line is shown in Fig. 1.

Later, after the line had been in operation some months, an increased run-off period was noted after pump-

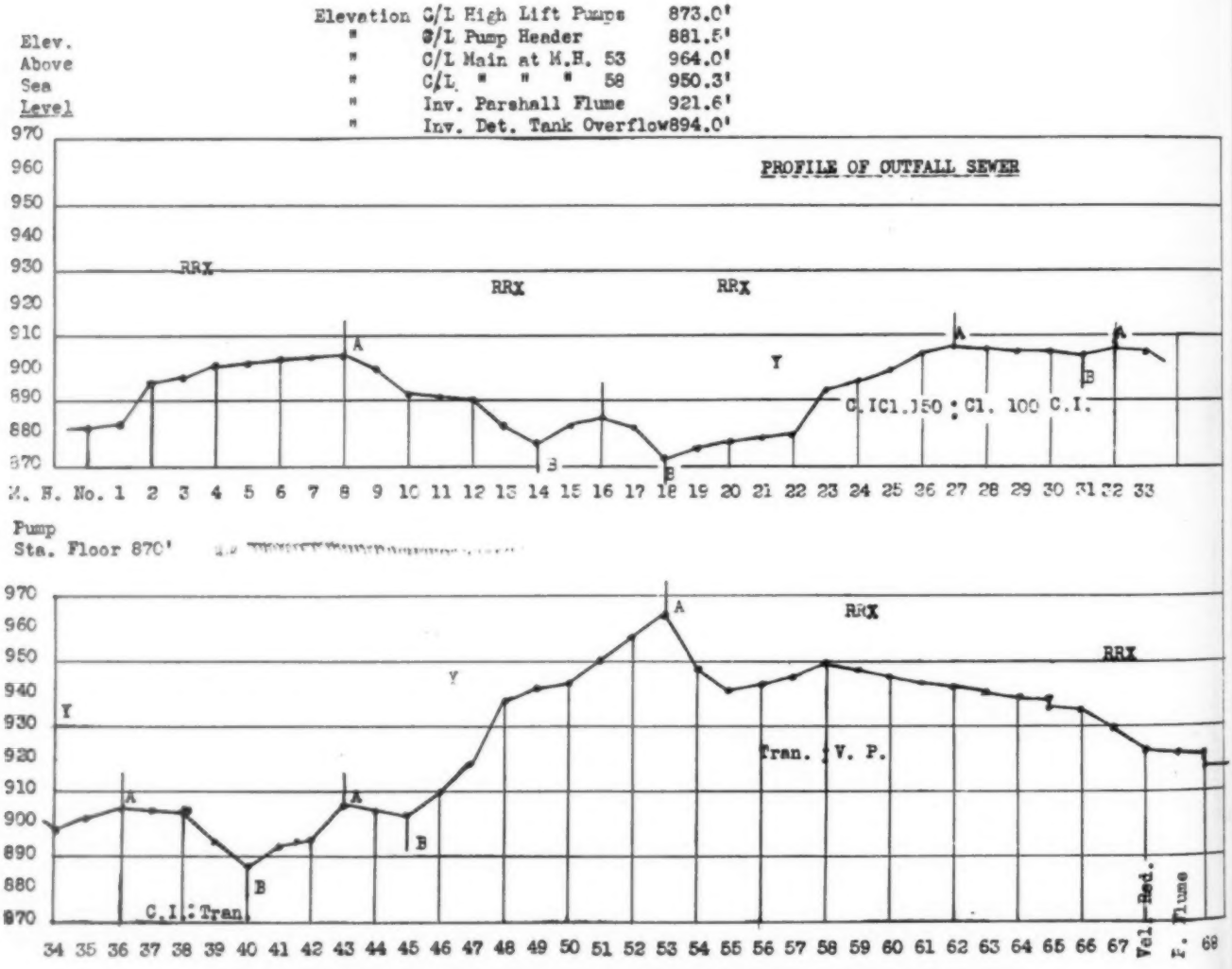

Elevation C/L High Lift Pumps 873.0'
" C/L Pump Header 881.5'
" C/L Main at M.H. 53 964.0'
" C/L " " " 58 950.3'
" Inv. Parshall Flume 921.6'
" Inv. Det. Tank Overflow 894.0'
Elev. Above Sea Level
PROFILE OF OUTFALL SEWER
RRX
RRX
RRX
Y
C.I.C1.150 : C1. 100 C.I.
M. H. No. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33
Pump Sta. Floor 870'
RRX
RRX
Y
Tran. : V. P.
C.I. : Tran
Vel. Red. Flume
34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68

Fig. 1. Profile of Outfall Sewer—Twin Cities Ordnance Plant, Minnesota.

ing stopped. Some unknown reservoir was supplying the flow. A suspected pond adjoining the line was exonerated, and the culprit found to be the threaded pipe. A leaky joint or joints filled the space between the inner and enveloping pipes and this reservoir leisurely emptied itself when pumping ceased. Grout, forced in to fill this reservoir and seal the joints, cured the trouble and run-off again became normal.

The vitrified pipe was quickly laid. The plans specified ninety-eight hundred feet of class 100 Transite to continue from the gravity end and then a mile of class 100 cast iron; and for the last two and a half miles, where pressures would be higher, class 150 cast iron. Shipment of class 150 and of Transite were promised by December 1st. The lighter weight cast iron could not be had before the end of the month. Early in December, pipe began arriving and valves and fittings dribbled in. Construction was pushed day and night. Germany had declared war. Pearl Harbor was attacked and haste was paramount.

No Leakage Tests

Sectional water leakage tests, as fast as pipe was laid and before covering, were called for by the engineers. Cold, haste and other reasons defeated this. An air test then was scheduled. Transite people objected to air, so into the ground went the pipe which was covered untested for pipe defects and faulty laying. This was a procedure warranted to invite trouble. Moreover the workmen laying the pipe knew it was not to be tested. Backfilling night crews overtook the laying crews and covered pipes partially calked, faultily calked and in some instances uncalked. It was cold and men were careless and haste was urgent. "Get the pipe into the ground and the sewer working so munitions can be made." "Fix the leaks later." That was the order and was obeyed.

Pressure-Vacuum Conditions

Shut-off valves were spaced five hundred feet or so apart. Luckily, enough were obtainable and recommendation to increase the interval between the manholes overridden. Low spots received blow-off valves and spouts.

Simplex type "AGF" Air release valves were placed at high points. Their purpose was to vent accumulated air, which, in sewage mains may be both entrained air and gases of decomposition. With positive pressures in the lines they accomplish their mission satisfactorily. After the force main was in use occasional rises in pressure of from three to eight pounds were noted on the line pressure gage at the pumping station. Sometimes reversion to normal would suddenly occur. More often a high pressure would persist, taking many hours of pumping, starting and stopping to bring it back. Evidently air was being entrapped which caused friction until it was vented out of one or another valve. This air could have been entrapped through a vacuum occurring after pumping ceased and while the line was coming to rest.

Another phenomenon observed was an occasional drop of four to five pounds in the static pressure

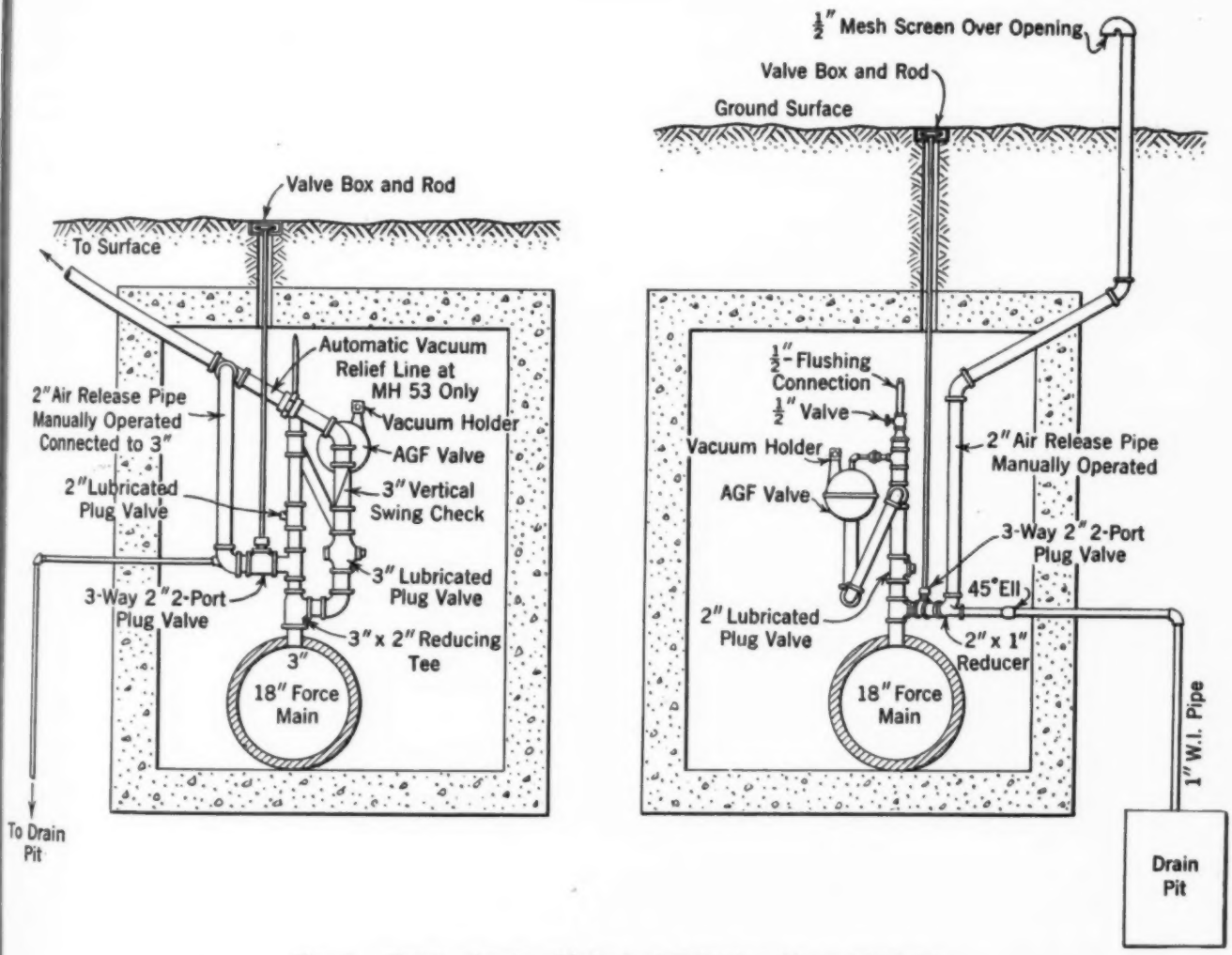


Fig. 2. Sketch showing Method of Releasing Air at Manholes.
(Check valves hold vacuum to prevent back flow. Manhole 53 shown on right; other manholes equipped as shown on left.)

at end of pumping. This would occasionally abruptly rise to normal and more often would persist until the next pumping cycle began.

Some siphoning action was indicated, probably as a result of negative pressures. Such would occur presumably at Manhole 53, the high summit where the theoretical pressure was zero. A Simplex vacuum holding attachment was placed on the air release valve at this point, (see Fig. 2). This is merely a small brass reverse ball check which permits venting but prevents air from reentering the line. Any internal stresses in the pipe through holding this vacuum would be negligible. The effect was immediate. The static pressure dropped from thirty-five to twenty-five pounds on the master gage. Siphoning had apparently carried back some 1350 feet to Manhole 50. Pressures at Manhole 53 and at the pumping station were observed when pumping ceased and were as follows:

Time	Pres. Lbs.	Vacuum Inches	Pres. at Pump	Remarks
10:30	0			Pump operating.
:31	"	11¼	9 in. vac.	Pump stopped.
:31½	"	7	25 lb.	
:32	"	9½	20	
:32¼	"	10	15	
:33½	"	8¼	32	
:33¾	"	9¼	15	
:34	"	9½	17	
:36	"	9	28	
:39	"	9	22½	
:40½	1½		25	Broke siphon. Air release valve expelled air for ½ minute.
:41	0	0	"	

Surges in the line were also materially reduced. Similar tests at other air release manholes resulted in placing these holding attachments on other Simplex valves.

Early Problems and Leak Repairs

Going back to construction days, three pairs of Wyes were placed at intervals in case booster stations should be necessary, but none have. One pair of these wyes is worth comment as having been set in a thousand foot section of Transite laid on trestles. This section crosses the muck and peat of a swampy stretch where good bearing ground lies eight feet below the invert.

On January 27th high lift pumps arrived; with these installed the pumping station, though incomplete, could pump sewage. The main was coupled to the station and four days later pumping started. It took some time to fill the line and then came trouble. The leaks began to show. They were dug up and repaired as fast as found. Most of them were in the class 150. A few leaks in the Transite could be attributed to faulty laying or poor backfilling. The mile of class 100 cast iron proved a perfect job of laying. Few defective pipes of any kind were found. A water test before backfilling, had it been possible, would have disclosed the leaks and saved a lot of grief and digging. No attempt was made to test the line for leakage until the following May. The leak detector method was first tried and proved inconclusive. Pressure was then raised in the class 150 pipe to two hundred forty psi. in an effort to blow out leaky joints. This drastic method did not meet with everyone's approval. Some joints were blown and when showing on the surface were repaired. Tests were then made to determine leakage in various sections of the line. Results were inconsistent, due presumably to leaking gates and air accumulating in sections under test. A profile study of the line was made to search out air and other features of the force main.

During these sectional tests, a field engineer, endeavoring to entrap some liquid asked a workman to stand by a valve. The man misunderstood and shut the valve against the pumping. The Transite blew out in three places. Rain of almost cloudburst proportions augmented the unhappiness that day.

Leakage Tests Made

The line again repaired, a static leakage test was tried with pumps down. A hose and gage glass were attached to a vent cock in the next manhole below the high summit and the summit opened to the atmosphere. Timing the drop in liquid the loss computed, for five miles of line, to one hundred thirty-six gallons per hour. Later the same day a pressure test indicated a leakage of one hundred thirty-two gallons per day per inch mile. Two standing pressure tests the following month showed the leakage down from one hundred thirty-six to seventy gallons per hour for twenty-six thousand feet of main. Apparently well within the specified leakage limit, the line was accepted. No serious leakage troubles have developed since.

More Troubles

Pumping, however, started another train of troubles. The surge tank did not function as expected; surges were too high. This was corrected in time. Excessive vibration of the pumps was quieted by inserting rubber pressure couplings. The correct grease was found. Manufacturers had their troubles with green help and a plethora of orders. The Macerator turned the opposite way from that intended. Pump shafts were threaded so the nuts unwound and impellers loosened. Keys were missing in important places. Most serious was the use of maximum type bearings in the high lift pumps, which would not stand the thrust. These pumps were specified to give 3000 gpm. at 190 lb. TDH. Rebuilt with Conrad bearings, and in some instances heavier bearings, the pumps have given good service since.

The Parshall flume and meter did not record the flow correctly. Excessive approach velocity pushed a wave past the float well orifice so a large flow was recorded as smaller than a lesser one. A velocity reducer, a concrete box with stop log baffles, was built upstream from the flume and connected to it with a rectangular channel of flume entrance size. This conducted an even flow to the flume at a rate of two feet per second. With an improved meter on the job, the flow was then recorded with astonishing accuracy.

The Load Was Doubled And Round Lake Utilized

While these problems were being solved the Ordnance Plant was being doubled in size, and then a further manufacturing addition built to make the secret incendiary bullets. The Outfall Sewer had been designed for Plant I requirement only. Plant II and Plant II Extension more than doubled the expected sewage. There was no time to build another force main and pipe was needed a thousand places elsewhere. Across the highway from Plant I there is a good-sized pond, a quarter section in extent, one of the innumerable "Round" lakes. Its effluent eventually reached Rice Creek, but after a devious journey, passing through two other lakes. Round Lake was purchased to receive the harmless process water from Plant II and Plant II Extension. Process wastes not put in the lake, together with sanitary sewage could be handled by the force main. Fortunately the engineers had fought for an adequate line.

To handle the process waste four pipes were led from each of the four

TABLE 1

Pumping Pressures in Outfall Sewer Air Relief Manholes
(No. 2 Pump operating unless other pumps also indicated.)

M.H. No.	Theoretical	6/3/43	(1) 10/6/43	Pump	(2) 12/22/43	(3) 2/2/44	6/18/45	10/15/45
1	60.8	62	67.5	...	63	60.5	68	69
16	62.7	64	66.25	#3	66	61.5	65	65.75
27	44.4	39	41.75	#7	42	43.0	42	43.5
32	41.0	37	37.50	#7	38	38.0	37	37.5
36	38.8	33	34.25	#3	38	35.5	34	34.75
43	33.1	28	29.0	#7	32	29.75	..	.....
53	0.0	0	0.0	...	0	0.0	..	Vac.

(1) Ten weeks before cleaning sewer.
(2) Day following cleaning, detritus loosened in C.I. section not fully washed out of sewer.
(3) Six weeks after cleaning.

large manufacturing buildings to adjoining diversion manholes; one pipe for strong acid waste; one for dilute acid; one for alkali; and one for soap. Each manhole was so gated that the flow from any pipe could be diverted either to the sanitary or to a special process line. Effluents of these process lines were collected at another diversion manhole where the combined flow could be switched into a drainage ditch leading to the lake or into the sanitary main leading to the pumping station detention tank. A sanitary overflow was also built from the detention tank to Round Lake so, in case of failure of the force main sewage, after chlorination, might be ponded in the lake until the Board of Health would authorize its release. An outlet dam controlled lake levels and the outflow.

Round Lake, of course, was under observation of the Board of Health and subject to frequent analysis by its laboratory specialists. The Ordnance Plant gathered samples also from Round Lake and from points below, for chemical and bacterial analyses in its own laboratories. Although the Federal Government bought the Lake, the State Department of Conservation claimed jurisdiction. The State Highway Department also invoked certain police powers regarding lake levels to protect its adjoining highways. Health, Conservation, Highway, Water Works and the operating company cooperated in friendly harmony for the good of all.

Operation of Pump Station

It is not amiss perhaps, to briefly note the operation of the pumping station. All process and sanitary waste from the original Plant I (assisted by two outlying lift stations) flows by gravity to the pumping station, passing through a mascerator or else through a bar screen into the wet well. Automatic float controlled low lift pumps boost the sewage to a 425,000 gallon detention tank. The purpose of this tank was to hold the sewage for neutralization of any slugs of acid that might come in. This neutralization takes place before the flow arrives at the detention tank as the $_pH$ record shows but the tank is useful as a cushion and for temporary storage. Plant II and Plant II Extension sanitary sewage and process waste not diverted to Round Lake, helped by one small lift station, flow by gravity directly to the detention tank or may be bypassed to the wet well. Ample apparatus for chlorinating either wet well or detention tank at a high rate is provided. High Lift pumps take the sewage from the detention tank

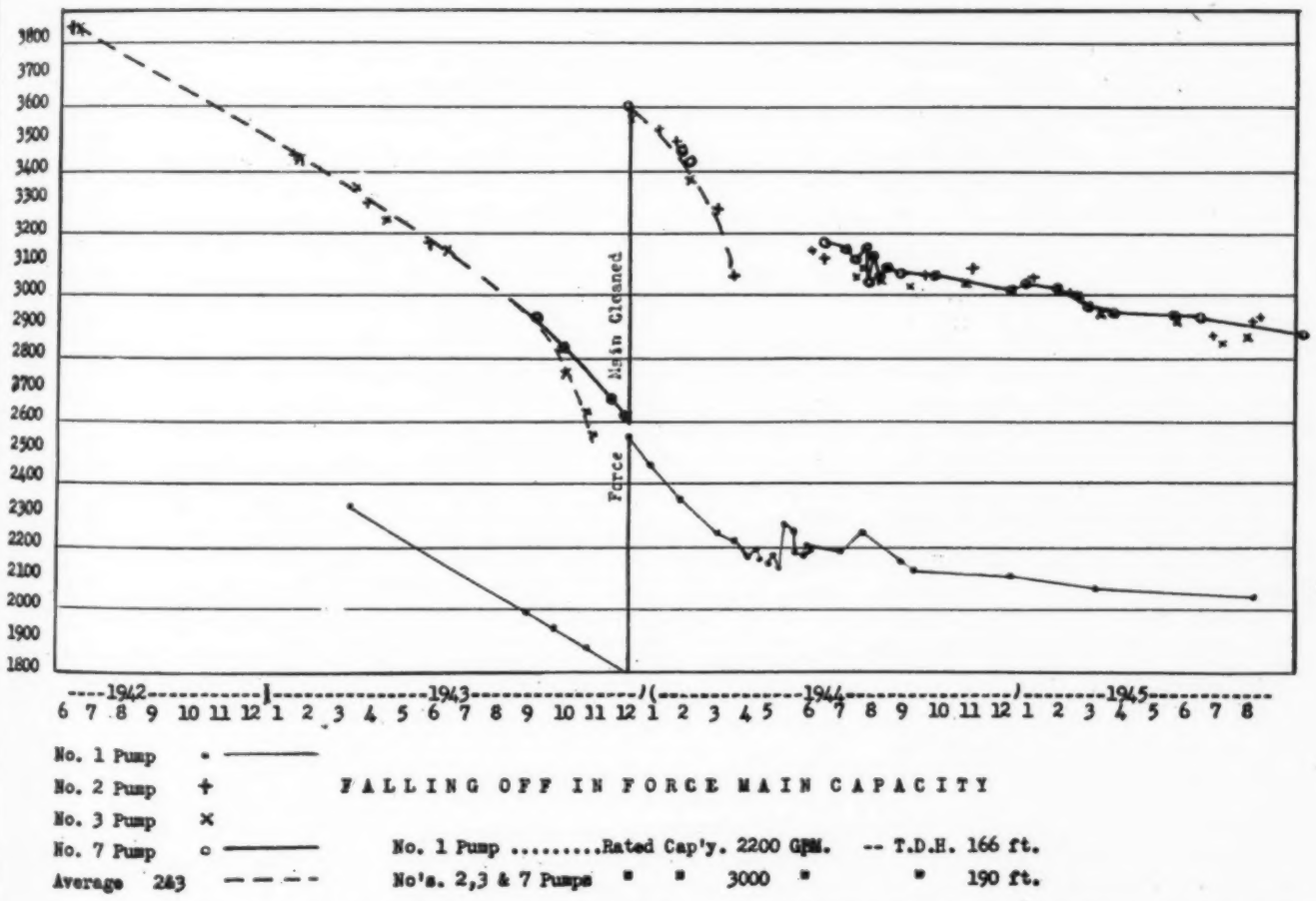


Fig. 3. Historical Graph of Delivery Capacity of Sewage Force Main of Twin Cities Ordnance Plant.
(Reveals rate of capacity loss, results of main cleaning, and subsequent trend in delivery rates. See also profile sketch and Table I of recorded pressures at various stations on this main.)

and send it down the force main to Minneapolis. In emergency the high lift pumps may draw directly from the wet well.

Line Capacity Drops Off

A falling off in pumping capacity greater than the wear and tear on pumps would warrant, was soon observed. This trend continued at a nearly constant but slightly accelerating rate as the graph in Fig. 3 shows. Examination of the main disclosed a friction build-up due to deposits of grease, soap and comminuted rags. Pressure records (Table I) in manholes along the line indicated that the trouble was mostly toward the Ordnance Plant end of the line in the class 150 cast iron pipe. In November, 1943, capacity had dropped from 3840 gpm. in June, '42, to 2600 gpm. and was nearing the danger point where the line would not handle the flow. A cleaning job was mandatory.

The National Water Main Cleaning Co. sent its field superintendent and cleaning tool and on December 21st the tool progressed through the line at the army marching rate without hindrance. Some good sized chunks of calking lead came out with the other detritus. Capacity was restored to 3600 and promptly commenced to fall off at a somewhat faster rate. This continued four months, when for some undetermined reason, the force main had a change of heart. No appreciable difference in the composition of the sewage occurred. No change in temperature more than a degree or two was noted. The volume of sewage pumped had dropped immediately after cleaning to about half, but was not greatly different from that of 1942 and the falling off in capacity at the rapid rate began at the outset with the smaller flow, continued with the high flow in 1943 and still continued for the first four months of 1944, again with the smaller volume. The volume of sewage pumped the first seven and one half months of 1944 did not vary greatly and did not diminish in the summer months, but in April the accustomed decline in capacity showed a spurt upward, then held nearly stationary until August and since then for the past year has declined, not at its former rapid rate, but at a comparatively moderate one. The end of the war and cessation of activity at the Ordnance Plant has interrupted the investigation and postpones another cleaning of the force main.

John Kienle Is Dead

John A. Kienle, who until his recent retirement to take up the life of a country gentleman on his Maryland farm, was Vice President and Director of Sales for Mathieson Alkali Works, died in Johns Hopkins Hospital, Baltimore, Md., on February 8, 1946. He was 61 years old.

John A. Kienle

Christened John Aspen Kienle, he was born in Wilmington, Del., Sept. 17, 1884. At Temple University in Philadelphia, Pa., he studied hydraulic engineering. After graduation he entered the Water Department of Wilmington in 1904 and by 1908 had become its Chief Engineer, which position he held until 1913.

While at Wilmington, Kienle became interested in the potentialities of liquid chlorine as a water purification agent and the Wilmington plant was the second in the world (Niagara Falls, N. Y., having the first experimental installation) to employ Dr. Ornstein's new process of water chlorination through use of a new device known as a "Chlorinator," in which chlorine gas was dissolved in water. This was offered as a simpler method than the use of bleaching powder. The process was a development of the Electro Bleaching Gas Co. of New York and in 1912 the first commercial "Chlorinator" was installed at the Wilmington Filtration Plant, which was constructed under John Kienle's direction as Chief Engineer.

During this period of chlorination development at Wilmington, Kienle met America's pioneer liquid chlorine producer, the late E. D. Kingsley, president of "E.B.G.,"who persuaded Kienle to join him in his new enterprise.

Consequently, in 1913, John Kienle became Sales Manager of the Electro-Bleaching Gas Co. of New York and Niagara Falls, the company now being known under the parent company's name—Niagara Alkali Co. In 1920 Kienle joined the staff of the Mathieson Alkali Works, Inc., being succeeded over at Niagara Alkali by his protegé, S. Willard Jacobs, also a former water works engineer from the St. Louis Water Department, who has since risen to the presidency of Niagara Alkali. In 1942 Kienle retired from his position with Mathieson to take up the life of a "country squire" on his Maryland farm, near Grasonville, raising blooded stock.

John ("Jack") Kienle became a member of the Am. Water Works Assn. in 1909 and, probably little known to many, was the fact that he was one of the organizers of its Water Purification Division and was elected its first Secretary, which office he held for the first five years of the history of the Division. He twice served on AWWA's Board of Directors (1936-'38 and 1939-'42) representing the Water and Sewage Works Mfgr's. Assn. In recognition of his accomplishments as a former water works engineer and his services to the Association, John Kienle was made an Honorary Member by AWWA in 1940.

Kienle was long active in the Water Works Mfgr's. Assn. also, serving as its "wheel-horse" Secretary for twenty-five years. At the conclusion of this service in 1942 the Association arranged a reception in his honor at which a presentation of a silver service was made on behalf of his friends in the two Associations. He was also a member of the New England Water Works Assn., the Am. Society of Civil Engrs., and other technical groups and trade associations. He was a former Director of the Chlorine Institute, Inc., and a long time member of the Chemists' Club of New York. John Kienle is survived by his widow, the former Marie W. Morris of Wilmington, Del., to whom he was married in 1914.

Sewage Projects Lead on Loan List of FWA

A nationwide trend toward improvement of sanitation facilities has been evidenced recently by positive action on the part of several states.

The latest survey of the Federal Works Agency, summarizing planning loans, shows that advances for municipal sewage projects comprise more than a third of the total volume of such construction projects.

The FWA figures, as of December 1, 1945, reveal that planning funds have been approved for 1,346 sewer, water, and sanitation projects, with the cost estimated at $595,000,000

AWWA BOARD ACTIONS

LaDue, Next President; Veatch, Vice-Pres.; Brush, Treasurer; Harding Awarded Diven Medal; Riedel Voted Goodell Prize.

THE Am. Water Works Association Board of Directors met in New York City on January 14 and 15 with all but three of the thirty-four members of the Board present. During the Board meeting the Nominating Committee selected the following as their choice for officers, this being tantamount to election automatically on March 1st, if no other nominations are made by the membership at large.

W. R. La Due
Akron, Ohio
(For President)

N. T. Veatch, Jr.
Kansas City, Mo.
(For Vice-Pres.)

For President

W. R. LaDue, Chief Eng'r. & Sup't. Bureau of Water & Sewerage, Akron, O.

For Vice-President

N. T. Veatch, Jr., Consulting Eng'r., Black & Veatch Engr's., Kansas City, Mo.

For Treasurer

W. W. Brush, Editor
Water Works Engineering,
New York City

Honors and Awards

The Board elected to Honorary Membership—

John R. Baylis

Eng'r. of Water Purification, Chicago, Ill."—distinguished for many years as a student and leader, and for his outstanding contributions to the field of water treatment."

(Other AWWA honors and awards which have earlier gone to John Baylis include the Goodell Prize and the Fuller Award. By the New England Water Wks. Assoc., he has twice been voted its highest award—The Dexter Brackett Medal—for his investigations in water filtration and contributions to the literature.—L.H.E.)

E. G. Ritchie

Former Chief Eng., Metropolitan Water Dist'r. Melbourne, Australia

"—distinguished as a leader and practitioner of the Association's highest ideals and its Code of Practice; a man held in the highest regard by his fellow workers in a distant land."

James C. Harding

Commissioner of Public Works
Westchester County, N. Y.

Was voted the highest award of the Association—the John M. Diven Medal—in recognition of his leadership of the committee which developed the AWWA Specifications for Deep Wells—an important contribution to the water supply industry.

Mr. Harding was cited "for a rare combination of engineering skill, leadership and diplomacy, manifested in the development of these important Standards."

C. Martin Riedel

Chemical Engineer, Chicago

Was voted the Goodell Prize for his paper "Chemical Soil Solidification and Chemical Sealing of Leaking Concrete" which was published in the Sept. 1945 issue of the *AWWA Journal.* Mr. Riedel's paper was cited as " a material contribution to the methods available to the water works profession in the solution of difficult construction problems".

A National Water Quality Standard

The Board confirmed its recent acceptance of the forthcoming revised "Standards for Drinking Water" of the U. S. Public Health Service, and by formal resolution adopted these Standards as National Standards for *all* public water supplies. It will be recalled by many that the proposed Standards of the Public Health Service were objected to on several important practical grounds. Through its efforts, the Association has now prevailed upon the Service to revise its Standards so as to make them acceptable to the Board, with the idea that AWWA, which had been contemplating the development of a National Standard applicable to all water supplies, could adopt an acceptable U.S.P.H.S. Standard as the National Standard and thus avoid duplication of Standards and possible conflict. Legally the U.S.P.H.S. Standards apply only to those water utilities supplying drinking water for us on public carriers and steamship lines. Therefore the endorsement by the AWWA Board has a much farther reaching influence on water quality to the entire nation than could the U.S.P.H.S. Standards when standing on their own.

We think that because of its ramifications of import, the last of AWWA's "Whereas" paragraphs, should be reproduced in full along with the actual resolution. Therefore, here it is:—

WHEREAS, It is the earnest hope of the AWWA that, as a result of its voluntary acceptance of the Drinking Water Standards as criteria of quality of all public water supplies in the United States, the State Boards of Health and their sanitary engineering personnel will find it possible to further constructive and cooperative relationships with Water Works Managements to the ends that deficiencies in water supply systems be corrected as promptly as feasible; that extraneous sources of contamination of water be eliminated; and that encouragement be given to training and employment of qualified personnel in positions of responsibility in the operation of water works,

Jas. C. Harding
White Plains, N. Y.
(Diven Medalist)

John R. Baylis
Chicago
(Honorary Member)

NOW THEREFORE BE IT RESOLVED by the Officers and Directors, acting for the American Water Works Association, that the 1946 Drinking Water Standards proposed for adoption by the U.S.P.H.S. be voluntarily accepted by our Association as the Standards for *all* public water supplies.

AWWA to Gather Statistics

Considered by this writer as long needed, and no better proven thus than in the early stages of our entry into World War II, the Board voted the necessary funds for the collection, analysis, assembly and publication of basic data concerning water works properties and practices in North America. The work is to be done by AWWA headquarters and for the year 1946 only those cities with a population of more than 10,000 will be covered.

The Public Relations Program

The report of the Public Relations Survey Committee (E. L. Filby, Chairman) was carefully considered by the Board and discussed. The Executive Committee was requested to bring to the Board at its May meeting, definite plans for Association action to promote better public understanding of the water works industry.

Water Works Practice

The annual report of the Committee on Water Works Practice, presented by Chairman Malcolm Pirnie, will be printed in the March issue of the AWWA Journal. The following items are of interest.

The Tentative Deep Well Specifications (see September, 1945 Journal) will be made *Standard* in May, 1946, unless formal objection of significant nature is filed beforehand.

Preparation of separate Specifications for (1) Standard Reinforced Concrete Pipe with Steel Cylinder, and (2) Prestressed Reinforced Pipe with Steel Cylinder, was authorized.

The "Recommended Procedure for Sterilization of Water Mains," prepared by a special committee headed by C. K. Calvert, will be published as a document separate from "Specifications for Laying Cast Iron Pipe". The new document will outline methods for sterilizing any type of pipe used as a water main.

The Board approved, in principle, the preparation of "Symbols for Utility Structures or Installations in Public Highways" as an inter-association text provided that cooperation can be developed with the American Public Works Association, the Federation of Sewage Works Associations and similar groups.

Water and Sewage Works Development

"Blue Print Now!" Comm. Inactivated

The Committee on Water and Sewage Works Development through its Chairman, Abel Wolman, recommended that "the Committee be inactivated, but its organization be maintained against such time when it may appear advisable to resume promotion of needed water and sewage works construction through nationally coordinated effort." The Board accepted this recommendation.

Recently, it has become evident that price levels, both for material and labor, are so uncertain that contracts either are let at prices substantially higher than had been anticipated, or that contract letting has been deferred until a more favorable price level becomes effective.

In the face of such conditions, the Committee agrees that it is not judicious to continue the promotion of water and sewage works planning. When and if, in the judgment of persons having to do with the making of policy for the constituent associations, it appears desirable to resume the inter-association promotion of water and sewage works planning, the Committee stands ready to serve the purpose for which it was originally established.

Manual of Water Sanitation Practice Found Objectionable

The Board reviewed the proposed revision of the Manual of Water Sanitation Practice, a document of the U.S.P.H.S. last issued in 1942 and now revised. The Board decided that it could not approve the revised text in its present form, since it is still phrased in a form to which exception had previously been taken, and continues to stipulate methods of water works construction and operation to which objections have been filed.

Water Works Equipment Price Rise Sanctioned by OPA

A recent order from the Office of Price Administration released certain items from control ceilings, thereby allowing a rise in the price of machined equipment and materials used in water and sewage works systems.

OPA's Order No. SO-129 grants exemption from price controls on machine parts, industrial materials and services, including valves and pipe fittings employed in water works construction. Practically all valve manufacturers have submitted new price schedules to OPA.

Price relief had been asked by valve manufacturers on the basis of an average increase of approximately 46 per cent in manufacturing costs experienced by the valve industry.

One valve and hydrant manufacturer informs us that wage raises now totalling 46.4 per cent have already taken place in the industry as a whole, and that the valve manufacturers are still faced with demands for further wage increases. Purchasers of valves and hydrants can therefore expect some increase in prices to in part compensate for the 46 per cent increase in cost of production which for the most part represents wage increases.

Chlorine Institute Holds 21st Annual Meeting

Re-elects Jacobs President

The Chlorine Institute, Inc., representing the liquid chlorine industry in the United States and Canada, held its 21st Annual Meeting in New York City on January 31st.

The Institute re-elected as president, S. Willard Jacobs, president of Niagara Alkali Co.; as vice-president, Eben C. Speiden, president of Innis, Speiden & Co.; as secretary-treasurer, Robert T. Baldwin, who has served the Institute in this capacity since its organization in 1924 for the purpose of standardization, promotion of safety and developing new uses of Chlorine.

The following are Directors of the Institute: George M. Dunning, Wyandotte Chemicals Corp.; F. W. Fraley, Diamond Alkali Co.; R. W. Hooker, Hooker Electrochemical Co.; S. W. Jacobs, Niagara Alkali Co.; E. C. Speiden, Innis, Speiden & Co.; Thomas Coyle, E. I. duPont de Nemours & Co.; W. I. Galliher, Pittsburgh Plate Glass Co.; Louis Neuberg, Westvaco Chlorine Corp.; E. E. Routh, The Mathieson Alkali Works; B. P. Steele, Pennsylvania Salt Co.; Eli Winkler, Southern Alkali Corp.

THE USE OF CALGON AT THE BRISTOL, CONN., FILTER PLANT*

By I. LAIRD NEWELL
The Henry Souther Engineering Co.
HARTFORD, CONN.

DURING the past four years, the water supplied to the City of Bristol, Conn., has been treated with Calgon (sodium hexametaphosphate) to minimize corrosion of the distributing system.

The Author

Bristol, a city of about 35,000, obtains its water supply from five upland reservoirs located from 1½ to 8 miles from the city. In 1938 an all steel Morse type filter plant was constructed and put into operation. The usual methods of water purification are used; namely, aeration, alum (0.05 to 0.75 gr./gal.), and soda ash (0.2 to 0.4 gr./gal.) followed by mixing, coagulation and filtration. The water has been treated with lime to correct the hydrogen ion concentration, and chlorine (.3 ppm.) is added to the filtered water as a precautionary measure. From the time the filter plant was put into operation in 1938 until Nov. 5, 1941, lime was added to the filtered water to maintain a pH value of approximately 8.5. Until the trial of Calgon, this was the only treatment given to prevent "red water."

The raw water from the reservoirs entering the filter plant may be characterized as soft, low in alkalinity and mineral salts.

For comparison with the treated water, the following figures are of interest:

TABLE I

Raw Water	March, 1942	November, 1945
pH	6.7	7.0
Alkalinity	5 ppm.	6 ppm.
Hardness	10 ppm.	10 ppm.
Color	23 ppm.	26 ppm.
Free CO_2	3 ppm.	1.5 ppm.

It will be noted from the analysis that, to prevent corrosion by the equilibrium method would require the use of such an amount of lime and soda ash as to materially increase the hardness and concentration of mineral matter. Since this would be objectionable not only from the industrial, but also from the domestic users' standpoint, it appeared desirable to investigate the use of Calgon.

*Early results at Bristol were published by the author in *Water Works and Sewerage* in June, 1942. This article brings the results up to date.

TABLE II

Analysis of Filtered Water Before and After Treatment

Date	pH	Alkalinity	Hardness	Color	Bacteria 20°	Bacteria 37°	Calgon
1941		ppm.	ppm.	ppm.			ppm.
Jan. 2	8.4	13	16	3	7	4	None
Feb. 7	8.1	12	14	3	16	2	None
Mar. 7	8.5	14	14	3	8	1	None
Calgon Treatment Started March 11, 1941							
Mar. 13	8.5	14	14	3	17	1	2
Apr. 18	8.5	15	22	3	46	2	2
May 8	8.7	14	18	2	950	1	1.5
June 13	8.6	14	20	3	60	4	1.5
July 18	8.1	11	20	3	16	5	1.5
Aug. 7	8.8	14	20	4	6	2	1.5
Sept. 11	8.1	12	16	3	13	9	1.5
Oct. 16	7.8	8	16	3	1	0	1.5
Lime Treatment Stopped Nov. 5, 1941							
Nov. 14	6.1	3	10	3	8	7	1.5
Dec. 19	6.1	3	10	3	0	0	1.5
1942							
Mar. 19	6.1	3	10	3	2	1	1.5
1943							
Apr. 8	5.7	3	9	7	2	0	1.4
1944							
Apr. 10	5.8	5	10	2	9	0	1.6
1945							
Nov. 1	6.5	6	8	2	..	1	1.5

Equipment for Feeding Calgon

Because of the fact that the filter plant operates at several different pumping rates, it was decided to obtain equipment for feeding the Calgon proportionally adjusted to different rates of flow. Briefly, the Calgon was made up in a 50-gallon earthenware crock in a concentration of approximately 12 per cent, which is equivalent to 46 pounds per 50 gallons of water. The solution is made by spraying cold water onto the Calgon, which is held in a wire basket directly over the earthenware crock. This solution is fed to the filtered water by a Wallace & Tiernan HEM Hypochlorinator, which is connected with the filtered water by means of rubber tubing. This equipment has been in continuous use since its installation and has worked with complete satisfaction.

Calgon treatment was started on March 11, 1941. The above table gives a record of the chemical and bacteriological results on random dates before and after the application of Calgon.

TABLE III

Tests of Samples from Distribution System

		Dead Ends				
Sampling point	No. 1	No. 2*	No. 3	No. 4	No. 5	No. 6	No. 7
Miles from filter plant	0	2.2	3.0	3.2	4.1	4.8	5.1
Before Calgon Treatment							
pH	8.2	8.3	8.8	8.8	...	8.8	8.7
Alkalinity	14	15	18	18	...	20	15
Color	3	3	85	100	...	50	28
Iron	0	.016	4.0	3.8	...	1.8	1.4
Dissolved oxygen	‡	‡	...	...	...	...	...
‡Saturated.							
After One Week of Calgon Treatment (2 ppm.)							
pH	8.4	8.5	8.3	8.5	8.5	8.4	8.5
Alkalinity	16	15	14	16	16	15	15
Color	3	3	35	60	50	30	30
Iron	0	.004	.38	.36	.24	.40	.60
Calgon	1.9	1.4	.5	.7	1.6	.8	1.7
After Two Months of Calgon Treatment (1.5 ppm.)							
pH	8.5	8.4	8.6	8.8	8.9	8.1	8.7
Alkalinity	13	14	16	15	15	11	15
Color	3	1	22	2	11	12	18
Iron	0	0	.5	.09	.55	.35	.09
Calgon	1.5	7	.8	.4	.3	.2	.7
*Center of distribution system.							

TABLE IV

After One Year of Calgon Treatment (1.5 ppm.)

Sampling point	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
pH	5.9	5.9	6.5	8.6	6.1	6.9	6.7
Alkalinity	2	4	9	12	6	11	9
Color	2	1	22	7	15	8	23
Iron	0	Trace	.45	.10	.25	.20	.40
Calgon	1.6	1.2	.6	.2	.2	.4	.2

Samples from Distributing System

In addition to the tests shown above, special examinations were made of samples of water taken at selected points in the distributing system. These are shown in Table III. It will be noted that the dead end samples showed high colors. This is due to the high concentration of iron in these samples.

These data in Table III show that in two months Calgon was reaching the ends of the system and having effect on the iron concentration and the color. There does not appear to be an exact relationship between the amount of Calgon present at the sampling point and the amount of iron and color.

Prior to the results obtained in Table IV, the addition of lime to the filtered water was stopped. It will be noted that, as a result, the pH values are much lower than previously. One sampling point, namely #4, shows a high pH, but this is due to the effect on the water of cement-lined pipe. There was no increase in corrosion of the pipes which could be attributed to the lowering of the pH.

Discussion of Results

Before going into a general discussion of the results obtained by the use of Calgon, it seems worth while to mention a few of the experiences as they occurred with its use. Directly after the original application of Calgon, which was at the rate of 2 ppm., some disturbance appeared in the system and it was decided to flush the pipes thoroughly. It is fortunate that this was done immediately, as extremely large amounts of tubercles and other corrosion products were sloughed off the inside of the pipe and removed from the system by blowing off. If this had not been done, the tubercles and other matter might have collected in some constricted parts of the system and caused serious stoppages. After the whole system was flushed, the treatment with Calgon was reduced to 1.5 ppm.

TABLE V

After Two Years of Calgon Treatment (1.5 ppm.)

Sampling point	No. 1	No. 4	No. 6	No. 7
pH	5.8	5.8	5.8	5.9
Alkalinity	5	5	5	5
Color	2	2	3	3
Iron	0	0	0	0
Calgon	1.6	.3	.1	.5

After Four Years of Calgon Treatment (1.5 ppm.)

Sampling point	No. 1	No. 4	No. 6	No. 7
pH	5.9	5.9	5.8	5.9
Alkalinity	5	5	4	5
Color	3	2	2	3
Iron	0	0	0	0
Calgon	1.3	.3	.1	.5

In order to have the Calgon reach some of the dead ends of the system so as to prevent corrosion at these points, it is necessary to bleed or flush occasionally.

Referring to Table II, it will be noted that directly after the treatment with Calgon, the 20° bacterial count increased to some extent, but it was possible to control this effectively by slightly increasing the chlorine dosage.

As shown in Table V after two years treatment (all but the first two weeks of which were at the rate of 1.5 ppm. of Calgon), the color in all the samples, including those at the ends of the system, are uniformly low. No iron is now found in the water after passing through the distributing system in spite of pH values as low as 5.8. It is difficult to account for the time taken to free the water in the system from iron, but it is apparently due in part to the condition of the piping when the treatment was started.

After more than four years of continuous application of Calgon, the results have been most satisfactory from the standpoint of checking corrosion of the distribution system of the Bristol water supply.

The author wishes to thank Messrs. F. J. Thiery and Clair Lourie of the Bristol Water Department for permission to use the data contained herein, and to acknowledge the helpful suggestions of Mr. Jas. A. Newlands, designer of the Bristol filter plant and president of The Henry Souther Engineering Co., in the writing of this paper.

Toxicity of Wastes to Fish

The Evaluation of the Toxicity of Industrial Wastes, Chemicals and Other Substances to Fresh Water Fishes, is a compendium of standard methods of toxicity measurement using fishes as test animals, developed and written by W. B. Hart, in Charge of Industrial Waste Disposal of the Atlantic Refining Co., Philadelphia, Peter Doudoroff, Biologist for the Division of Research and Statistics, for the Louisiana Department of Conservation, and John Greenbaum, Fishery Biologist of the Wisconsin Department of Conservation, LaCrosse, Wis.

Published in preliminary mimeograph form, this 317 page book comprises a reference work which all consulting chemists and engineers should have at their disposal, particularly if they are confronted with any question as to the toxic effect of industrial waste on aquatic life.

Although the material is voluminous, and apparently intricate in presentation, the authors claim that "careful study of the various sections will reveal that the procedures are essentially simple, and require no unusual technique or equipment." The volume of the material in the presentation is caused by the considerable detail which has been inserted for the benefit of the most inexperienced laboratory technician.

In regard to the test animals, the book contains sections on sources, kinds, identification, size, climatizing, and fitness of the test animal. There are sections on solutions for performing toxicity tests, examination of the substance to be tested, evaluation of toxicity, and using the results. In addition there are twelve appendices on various subjects pertaining to the evaluation of the toxicity of industrial wastes. Copies of this valuable reference may be obtained by writing W. B. Hart, Industrial Waste Disposal Division, Atlantic Refining Company, 3144 Passyunk Ave., Philadelphia 1, Pa.

Sanitary Engineering Department at Johns Hopkins University

Announcement has been made of the creation of a department of Sanitary Engineering at Johns Hopkins University, to be headed by Dr. Abel Wolman. Undergraduate work in this department will be essentially civil engineering, while postgraduate training will receive major emphasis in the department. Dr. Wolman plans to integrate the work in the new department with the departments of biology and chemistry and the school of hygiene and public health. New laboratory facilities will be provided and other facilities enlarged for graduate study in sanitary engineering.

TWENTY-NINTH MEETING OF FOUR STATES SECTION AWWA

BALTIMORE, the city of Edgar Allan Poe and Francis Scott Key; one of the two cities in the country where the local police are

Chairmen

(Incoming)
H. E. Moses
Chief Engr.
Pa. Bd. of Health
Harrisburg, Pa.

(Outgoing)
R. C. Beckett
Chief Engr.
Del. Bd. of Health
Dover, Del.

under the governor of the state, not the mayor; and the city that now has its fourth Republican mayor since the war between the states, was the meeting place of the 29th convention of the 4-States Sect. of AWWA. Attendance was nearly 200, the papers were good, the food excellent, and the entertainment amusing.

New Officers

Elected to serve for the ensuing year were the following officers:

Chairman
H. E. Moses, Chief Engineer
Pa. State Dept. of Health
Harrisburg, Pa.

Vice Chairman
S. C. Blackburn, Filtration Engr.
Baltimore Water Dept.
Baltimore, Md.

Secretary-Treasurer
H. Lloyd Nelson, Eastern Manager
U. S. Pipe and Foundry Co.
Philadelphia, Pa.

Trustee
Wm. Edwards, Supt. Water
Cumberland, Md.

Fuller Award

Fuller Awardees come and go, but secretaries usually go on forever. All of which is to say that while other men receive the plaudits and the glory, hard working secretaries quietly go about the business of holding an organization together, and generally making it a success. For just such a yeoman service, the 4-States recognized both the ability and capability of H. Lloyd Nelson by presenting him with the Fuller Award for 1946.

So self-effacing has been the service of Lloyd Nelson, that the Committee literally had to dig, to find the information on the awardee, and yet when the report was completed, it was one of the longest and most interesting recitations of service that this reporter has heard; service to two sections of AWWA, to the AWWA itself, to his company, to the war efforts of the country, to the water works industry in general, to his community, and to the Boy Scouts of America, among others.

The actual citation read, "For applying sound technical reasoning

Fuller Awardee
H. Lloyd Nelson
Eastern Manager
U. S. Pipe & Foundry Co.
Philadelphia, Pa.
(Secy. 4-States Section)

in reducing pipe corrosion, for strengthening our association, for service to our country and our profession during World War II, and for unselfish promotion of the dignity of man in business and in private life, the committee has chosen Harry Lloyd Nelson to receive the George Warren Fuller Memorial Award for 1946."

Electronic Water Purification

The electronic method of water purification does not employ radio waves as one might expect from the name. This new method of coagulating water introduced by the Stuart-Brumley Co. of Baltimore was described by **C. G. Haney,** Research Engineer, in a paper entitled "Electronic Method of Water Purification."

Briefly the method consists of passing water through a grid of relatively closely packed aluminum plates across which a low voltage is impressed. The aluminum sheets are ⅛-in. apart. Under the influence of this low electric current, the water is not electrolyzed, but a small amount of aluminum is removed from the plates to become aluminum ions which immediately floc out, thereby reducing color, turbidity, and bacteria.

The amount of electric current required, and the amount of aluminum discharged into the water and removed as floc will vary; during the process, a low pH of 6.0 will be raised to 7.0, or a high pH of 10.0 will be lowered to 8.0, while the total alkalinity and hardness are reduced. The equipment and process is still in the experimental stage.

Reconversion

Harry Jordan, Exec. Secy. of AWWA, talked about reconversion and centered his comments on surplus property, post-war planning, and how to compete with industry for personnel.

Attitudes, ideas, and methods of obtaining war surplus property change rapidly and are often involved; therefore one should establish a relationship with some organization or bureau concerned with the disposal of surplus property (e.g., the USPHS, RFC, and others).

On the matter of **Blueprinting Now,** Mr. Jordan said that efforts to date had resulted in about three times the normal amount of planning, *but* uncertainty of materials, labor, and contract costs make it impossible to carry through the plans already completed. Mr. Jordan believes no new plans should be started but that plans already

Programmers

C. H. Capen, Jr.
Ch. Engr., N. Jer. Water Comm.
Wanaque, N. J.

H. E. Jordan
Exec. Secy.
AWWA
New York

developed should be carried forward, if possible.

Regarding personnel, water works utilities must face the reality of competition for men from industry which generally pays higher wages for shorter hours. The water utilities must study job classifications and rates of pay if they are to hope to attract young men of skill and education.

Stream Purification

The problems of "Stream Pollution" are recognized by the conservationist, the water works man, and the sportsman, according to **J. R. Hoffert,** Asst. Chief Engr., Penna. Dept. of Health, and it is now time that we bring recognition of these problems to the man in the street.

While both municipal and industrial wastes must be removed from streams or at least greatly reduced, industry must not be penalized. Cooperation is needed with other states in the matter of stream improvement and one of the best examples of this cooperation is Incodel which covers four zones of the Delaware River.

Mr. Hoffert reviewed the Pennsylvania laws and the success to date of the program in that state, citing many examples of industry which had found by-product recovery to be economically feasible. Other industrial establishments have recognized the problem and cost of waste treatment as a legitimate part of the capital structure and cost of production.

Ed. L. Cotten, Engineer Secy., Interstate Comm. of Potomac River Basin, discussed the subject of Stream Pollution from the experience of his commission. Mr. Cotten also commented on the various stream pollution improvement bills before Congress, remarking that he believes the Barkley-Spence bill the best, with its provision to set up in the USPHS a division to correlate the efforts of the states.

Corrosion Control

Corrosion of metals would not occur in water systems if oxygen, carbon dioxide, and hydrogen sulfide were kept out of water and the iron surfaces were sealed off. This observation was made by **John R. Lill,** Chemical Engineer, of Sheppard T. Powell Engineers, Baltimore, in his presentation of a paper on "Recent Developments in the Problem of Corrosion Control."

Two types of treatment now in vogue are deaeration and surface protection. Vacuum deaeration has not been used on municipal supplies but has found many applications in industrial water treatment (see article on Vacuum Deaeration by Sheppard T. Powell, in the March issue of *Water & Sewage Works*).

Surface protection is subject to failure in waters that will not deposit scale, waters that deposit bulky and porous scale, and when there is non-uniform deposition of scale. Non-deposition may be caused by the presence of organic matter, algae, hexametaphosphates, or free oil. Mr. Lill's paper was devoted principally to the control of corrosion in industrial and boiler water supplies.

Geology and Ground Water Supply

Jack B. Graham, Asst. Geologist, Div. of Ground Water Survey, U.S.G.S., Philadelphia, in his paper on "Geology and Ground Water Supply in the 4-State Area" explained that the type of rock affects the water constituents.

In this particular section there are three surface patterns, Coastal Plain, Piedmont Plateau, and Appalachian Region. The average production of wells in the Coastal Plain is 200 to 300 gpm., while in the Piedmont Plateau the yield is from 25 to 50 gpm. There are no large communities in the Appalachian region where the water supply is taken from the ground, but small communities and rural areas do use ground water in this region. Industries use ground water to a large extent particularly in the Coastal Plains.

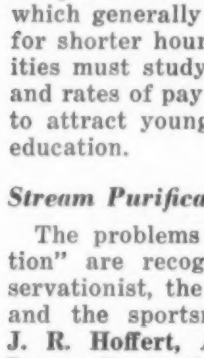
Ground water pollution consists of salt water, particularly in the coastal plain, industrial waste and sewage from stream infiltration, and sewage from disposal into wells.

In the discussion of this paper, **Dr. Joseph T. Singewald,** Director, Dept. Geology, Mines and Water Research, Johns Hopkins Univ., Baltimore, explained the cooperative studies being made in Maryland on the depth and yield of wells. The department is spending $30,000 a year in carrying out these studies. Well drillers are now licensed in the state and are required to obtain a permit for each well drilled and to give a log of the well, specifications, yield, etc.

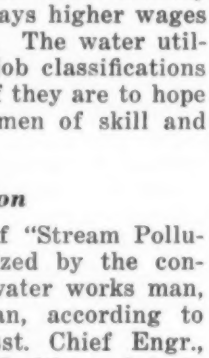
Robert R. Bennett, Assoc. Geol. Div. of Ground Water Survey, U.S.G.S., Baltimore, said that ground water consumption in the Baltimore area was now a serious problem with a withdrawal of 40 mgd. The water table level has dropped 160 ft. Fortunately the withdrawal is 10 mgd. less now than in 1942. The seriousness of the problem is accentuated by the fact that the artesian head is now 50 to 100 feet below sea level.

Training Water Works Personnel

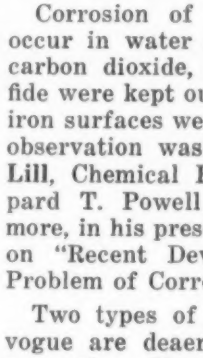
A. M. Tawney, Assoc. San. Engr., U. S. Corps of Engineers, Ft. George Meade, Md., told how during the war he had trained not only 42 different men for his own plant but in addition 15 civilians and 19 mil-



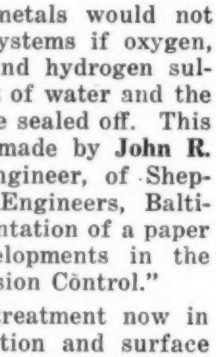
L. N. Thompson
Supt. of Water
St. Paul, Minn.
(Pres. A.W.W.A.)



J. R. Hoffert
Asst. Ch. Engr.
Pa. Dept. Hlth.
Harrisburg, Pa.

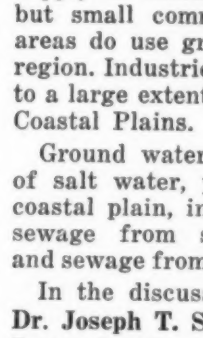


A. M. Tawney
Assoc. San. Engr.
Corps of Engrs.
Ft. Meade, Md.

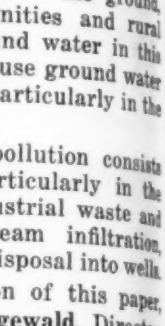


Thos. F. Wolfe
Res. Engr., C. I.
Pipe Res. Assn.
Chicago, Ill.

Program Participants



I. M. Glace
Cons. Engr.
Harrisburg, Pa.



C. G. Haney
Res. Engr.
Stuart-Brumley
Baltimore, Md.

itary personnel for other plants of the army.

Key to the success of the training program was the flexibility of performance taught the men and a systematized training schedule, based on and developed from In-service Training Programs of the Government.

New Developments in Water Rates

Under this title **Charles H. Capen, Jr.**, Chief Engr., North Jersey Dist. Water Supply Commission, Wanaque, N. J., presented one of the highlights of the meeting.

One of the main reasons for not making a change (even though warranted) in water rates is the fact that bills are rendered quarterly instead of monthly and even a small per cent raise would be more noticeable on a quarterly bill. Mr. Capen recommends monthly billing as is done in the other utilities.

There is little reason to doubt that rates will have to be raised after World War II. Rates were not raised enough after the last war and as a result municipal utilities suffered during the depression years when they had large outlays for capital debt, and consequently had to cut operating expenses as much as a third, while income actually decreased by only some eight per cent.

Generally speaking, water works men are looking for a gradual resumption of consumption approaching that during the war. This will call for expansion which means more capital debt. The answer is to raise rates to support this debt structure and sound operating costs.

Among the problems to be considered in rate structures is that of wholesale water. In many metropolitan areas, small municipalities must purchase water from other municipalities. One of the most complicated of these situations exists in Northern New Jersey where there are 33 separate communities and two water companies which obtain their supplies in this manner. Price range varies widely.

Rates for industrial water must receive attention. In most localities the ratio of industrial rates to domestic rates are not based on sound judgment, engineering, or financial considerations. As a result, industry often will not locate in such communities. Industries either move or fail to locate because of unfavorable slides in the water rate structure.

Although some industrial rates are well out of line, in other instances, water is being sold at out-of-pocket expense or at an actual loss. Such a situation cannot continue in times of drought or depression.

The solution to the problem of rates lies either in the producing and selling of more water without increasing overhead materially, or in establishing low cost industrial supplies, perhaps from other sources than the municipal supply.

In discussing Mr. Capen's paper, **I. M. Glace**, Consulting Engr., Harrisburgh, Pa., said, "The utility which lives from hand to mouth does the consumer no favor." Rate schedules are too often plagiarized from other municipalities or are developed by the cut and try method. What is needed is sound engineering study of rate structures and the basis for forming them. This can best be done on the individual supplies.

Preventing Breaks in Cast Iron Pipe

Cast iron pipe is designed for internal water pressure, water hammer, trench load, and traffic load among other things. When breaks occur they can generally be laid to faulty construction according to **Thos. L. Wolfe**, Research Engr., Cast Iron Pipe Research Assn., Chicago, although there are other causes. This has been shown from a study of pipe breaks.

For example, it was found that of 126 breaks in northern Illinois and southern Wisconsin, 58 were due to faulty construction, 11 to excess pressure, 10 to corrosion, 5 to excess load, and 5 to faulty pipe, (no reason found for 37). Fifty seven per cent of the breaks occurred in 6-in. pipe over 50 years old. Chicago has had one break per 31.5 miles of pipe per year while St. Paul's record was one break per 29 miles. (**Lloyd Nelson** said that per hundred mile of pipe, break frequency was 18 on 3-in., 10 on 4-in., 6 on 6-in., 4 on 8-in. and less than one on 10-in.)

Among the primary causes of breaks are damage before installation, damage by other construction operations, corrosion, taps used being too large, and beam action on faulty subsoil.

The paper was discussed by **Joseph S. Strohmeyer**, Baltimore, who believes that the most important element in the prevention of breaks is the proper location of pipe with respect to other utilities, as well as proper excavation and backfilling.

The annual banquet was addressed by Leonard Thompson, President of AWWA. Mr. Thompson talked on the size of the water works industry and the need for sound public relations. (G.E.S.)

Electric Power Workers' Strike Affects Water Production in Texas

Last October employees of the Lower Colorado River Authority opened master switches and stopped electric generating turbine equipment, thereby depriving homes, army camps, municipal water plants, ice plants, and hospitals of electric power. This sudden stoppage of electrical current produced emergency in practically all water supplies operating on power from that source. In the *Southwest Water Works Journal* for December, Bob Gresham, the Editor, reports on what happened to some of the cities so affected.

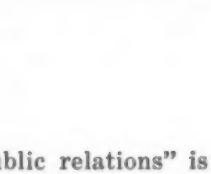
In one city, for example, where daily consumption was 100,000 gallons and the storage 75,000 gallons, a natural-gas-operated standby engine was pressed into service. In another, the fire truck pumps were pressed into service but the wells could not be operated and this town plans immediately to purchase an engine-driven generator as standby equipment.

Still another doled out their limited supply at reduced pressure and they, too, have plans to purchase a gasoline powered generating unit. In one city where sewage lift pumps were out of service, raw sewage flooded the manholes. Several other cities which had fairly large storage capacity were able to get along fairly well, and those municipalities having gas or gasoline engines, standby generators or standby pumps were able to meet the emergency without loss of service.

PUBLIC RELATIONS IN WATER WORKS MANAGEMENT*

By MAX K. JONES
Manager
HUNTINGTON WATER CORP.
HUNTINGTON, W. VA.

THE term "public relations" is a very glittering and popular phrase at this time, and we all know that the character who was known as the "Advance Man" for the circus when we were boys now calls himself "public relations counsellor" and has a very fancy business card. For the purposes of this paper, however, the phrase "public relations" involves the contacts of a business organization or any other kind of group activity, or an individual himself, with the public, the employees, and, if there are any, the owners of the business, or in the case of a non-profit or charity organization, those who furnish the funds.



The Author

Attention here will be directed to public relations as they affect a water department or a water company. There is little if any, difference between the two types of water works operation; and the author's intention is to make no distinction except to say that when speaking of owners of the business he means for a publicly owned water works, the taxpayers and voters of that community, whereas for a privately owned water company he means the common stockholders.

*This paper presented before the West Virginia Section of the Amer. Water Works Assn. is here published by permission of the Association.

Max K. Jones, the author of this paper, has a reputation for his work in the line of developing local publicity for the Huntington Water Corporation*, and programs for developing improved public relations in the community served.

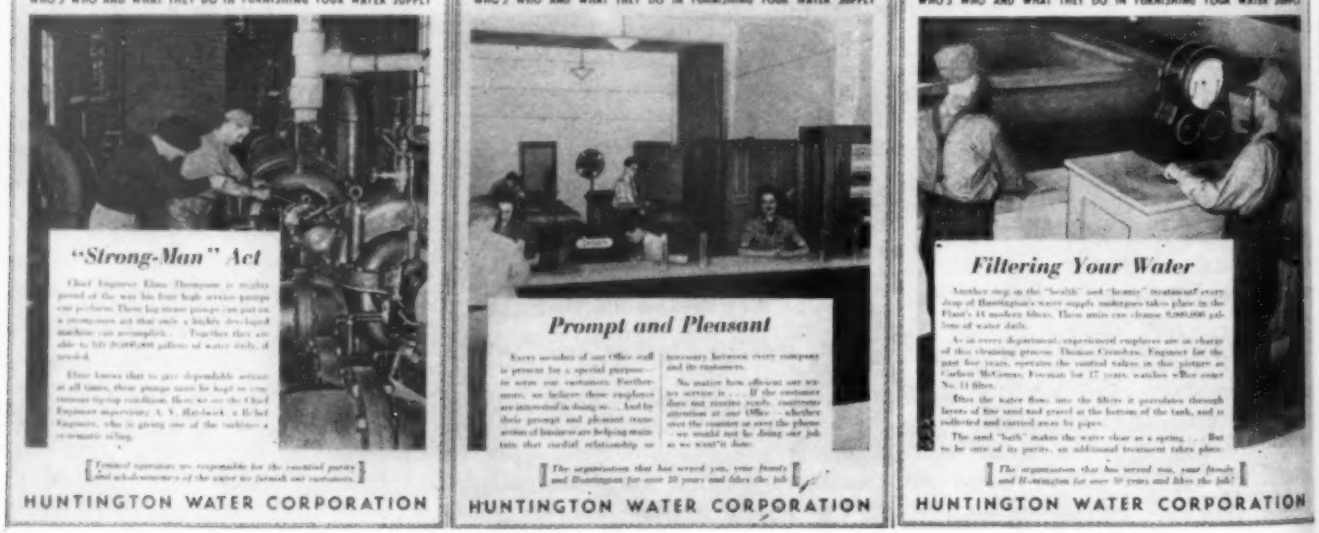
At its 1945 Annual Conference the West Virginia Section of AWWA voted Manager Jones the Fuller Award in recognition of his attainments in advancing public relations between the water utility and the people of Huntington, who only recently voted down a proposal that the city purchase and operate the company owned water supply system.

*An Am. Water Works and Electric Co. subsidiary.

Groups Affected by Water Works Operation

The water works industry has three groups of people who are directly affected by its operation. These are, and not necessarily in the order of their importance, the customers or the general public, employees who work in the business, and the owners, who, as previously noted, may be stockholders or taxpayers. In the case of a publicly owned enterprise the taxpayer and the customer are more or less the same group. Nevertheless, they approach the problem of the water works and its service to them with a different frame of mind, depending upon whether at the moment they are taxpayer conscious or customer conscious.

Any approach to public relations starts with the word "information"—what our friends in the City Room call "news," but not necessarily newspaper stories. Peoples' convictions cannot rise above their understanding; therefore, if it is your desire to have sound harmonious public relations, you must secure an understanding of your operation by the three groups just described. An understanding or knowledge of your operation, its problems, aims and policies, can be secured only by the dissemination of information.


WHO'S WHO AND WHAT THEY DO IN FURNISHING YOUR WATER SUPPLY
"Strong-Man" Act
HUNTINGTON WATER CORPORATION
WHO'S WHO AND WHAT THEY DO IN FURNISHING YOUR WATER SUPPLY
Prompt and Pleasant
HUNTINGTON WATER CORPORATION
WHO'S WHO AND WHAT THEY DO IN FURNISHING YOUR WATER SUPPLY
Filtering Your Water
HUNTINGTON WATER CORPORATION

Specimens of Newspaper Ads and Leaflets Developed by the Huntington Water Corporation
In the brackets is stated—"Trained operators are responsible for the essential purity and wholesomeness of the water we furnish our customers"

Types of Information for Each Group

Different types of information must be put before each different group. For instance, the employee group is actively interested in information which affects the job. The employee wants to know, and is entitled to know, what your rules and regulations are. What are the chances for advancement or promotion? What are your sick leave provisions? Will he be protected by group insurance in the case of his demise? Will he have a pension when he is old, tired and desirous of retiring? A sound personnel relationship between the employer and the employees is a part of good public relations. It has been proven time and time again that an organization cannot maintain a sound public relations standing in the community unless it has an equally satisfactory relationship with the employees who make the product or produce the service. Modern and effective personnel policies are, therefore, a part of the development of any over-all public relations program.

Our object in the water works business is to convince the customer that the water he receives is pure and wholesome, that it is abundant and that the water system serving him is in a position to take care of his needs now and in the future. To do this, the best public relations tool known is sound publicity. By that is meant stories in the daily newspapers, for every water organization is the source of excellent news material. Another way to do it is to throw open the plant and invite the public to inspect it and learn more at first hand about this vital service.

The author has played host to a civic group at a large luncheon served in the boiler room, with the speaking program at the conclusion of the luncheon being broadcast over the local radio station. There are few business leaders in town who have not visited the water works plant and seen the whole operation under expert and instructive guidance.

Good Newspaper Stories

To be more specific about newspaper publicity, here are a few types of good stories. Take one of the key jobs for instance, such as your chemists. Tell the story of the chemist and what he does and what his responsibility is in helping to maintain a pure and wholesome supply of water. This is what newspapermen call a "feature" story. It is a good type of news story and you will find that your local paper will be glad to publish it. Your chief engineer or man in charge of the distribution system, even an interview with a meter reader, can be made intensely interesting. Of course, you must always give public information through the press on new developments which affect the water works. The installation of new pumping equipment, the construction of new filters, or the installation of additional mains are always news in any community. News should be accurately and promptly placed before the public in the medium they are accustomed to use. There is only one such medium and that is the daily newspaper.

Radio always plays its part in any public information program which is part of the general public relations policy. Many different kinds of radio features have been sponsored. For example, certain companies associated with the author's organization have assumed sponsorship in the broadcasting of games played by local athletic teams, such as the high school basketball team. They have used their commercial time to acquaint the public with the advantages of a complete and intelligent use of their water service. Another company has sponsored the local weather broadcast and, of course, there are many other methods in which radio can be employed to advance the public relations standing of your enterprise.

Newspaper Advertising

The author is a firm believer in the value of newspaper advertising, particularly that which is largely of an institutional and informational character. You may ask: Why should a water works plant advertise—our market is assured and we have nothing to sell? Why bother with it? But you do have something to sell. There are periods of the year when you can use your advertising space to increase the use of your product. Lawn and garden sprinkling is a fertile field for increased domestic use. A con-

WHO'S WHO AND WHAT THEY DO IN FURNISHING YOUR WATER SUPPLY
A Familiar Face
HUNTINGTON WATER CORPORATION
WHO'S WHO AND WHAT THEY DO IN FURNISHING YOUR WATER SUPPLY
Transportation Transformed
HUNTINGTON WATER CORPORATION
WHO'S WHO AND WHAT THEY DO IN FURNISHING YOUR WATER SUPPLY
Checking for Accuracy
HUNTINGTON WATER CORPORATION

Specimens of Newspaper Ads and Leaflets Developed by the Huntington Water Corporation
In the brackets, this slogan—"The organization that has served you and Huntington for over 50 years."

tinual reference to the desirability of personal cleanliness by greater use of baths is also a way to build up gradually the load. Then too, the use of advertising space can be most effective in putting before the public types of information about your operation which do not come under the head of news. This type of advertising is usually known as "institutional."

As regards the owners of the business, the stockholders or taxpayers, they are entitled to adequate information concerning the financial results of your operation. More and more, municipal water works operations are issuing public annual reports, indicating how and where the money was spent to provide the public with service. It is good business to keep the owners adequately informed, because when additional capital is needed, it is this group that must supply the funds that you require. If they are not informed, it will be more difficult to secure the capital. The author has no experiences in municipal operation, but it would seem to him that the publicly owned water works that had gone to the trouble of keeping the taxpayers advised as to its operating results and financial standing would have less difficulty in securing from those same taxpayers consent to spend the money that is needed to provide new or better facilities or additions to the plant.

Any one of the three groups above mentioned can make your operation so unpopular that your day to day duties will be, to say the least, most complicated and discouraging. If your employees do not like you and are dissatisfied and unco-operative, your job will be unpleasant. If the customers think your service is poor and have no conception of your problem, then, too, your life will not be a happy one; and finally, if you are cramped for funds and unable to secure modern, efficient equipment or to make the extensions that are required, your day-to-day business affairs will be of the type that brings lines to the forehead and silver streaks to the hair.

A Sound Approach

A sound approach to the problem of maintaining, generating and then extending a sound public relations standing for your particular enterprise may be obtained in the following way: First, study your problem. Where are you weakest? What phase of your public relations problem should be first attacked? Second, having developed your problem and having determined your objectives, go to work and from time to time pause to study the results obtained. Third, do not become discouraged after a year or two of time and effort devoted to securing a better public relations standing. It takes time for any organization to "win friends and influence people." It cannot be done overnight, it is a 24-hours-a-day, 52-weeks-a-year job. And, finally, as you embark on a plan of public relations, try to get everyone you can on your team. The group that will help you most at first are your employees, but a few influential members of the other two groups—the public and owners—will help beyond measure.

Committee on Water and Sewage Works Development Ceases Activity

The Committee on Water and Sewage Works Development, a joint committee of the NEWWA, the AWWA, the WSWMA, and the FSWA, has announced its cessation of activity for the present. This committee, which was formed to carry the gospel of **Blue-Print Now** throughout the country during the war, has found that by the middle of last year water and sewage works planning was in progress throughout the country at a rate of about three times its normal frequency in the public works field. A number of these projects have gone forward to the contract-letting stage, but within the last few weeks it has become evident that price levels, labor, contracts, etc., are either so uncertain or so much higher than anticipated, that contract letting has been deferred. According to the released statement from the Committee, "in the face of such conditions the committee agrees that it is not judicious to continue the promotion of water and sewage works planning in areas where planning has not already been started. The committee recommends that the constituent associations allow it to retain its form of organization so that it may serve when and if it appears desirable to resume the inter-association promotion."

Construction Industry Stabilization Bill Introduced in Congress

In a comprehensive bill introduced by Senator Murray in Congress, it is the purpose "to aid in the stabilization of construction by advance planning of public works, and to reduce, by timing of public construction and by other means, the violence of seasonal and long-term fluctuations in the total volume of new construction, maintenance, and repair work in the U. S."

According to this bill, the Secretary of Commerce will act as chairman, and together with the secretaries of Agriculture and Labor will constitute a Construction Policy Board operating in the executive office of the President and advising both the President and Congress. In addition, to assist the Policy Board, there will be a Public Works Stabilization Committee and a Construction Industry Advisory Committee.

The Public Works Stabilization Committee is to be composed of the Federal Works Administrator as chairman, the Chief of Engineers of the U. S. Army, and the Commissioner of Reclamation, the Director of the Bureau of Budget, two members representing the states, two members representing municipalities, and two members representing other political subdivisions. The Construction Industry Advisory Committee is to be made up of 16 men representing various phases of the construction industry.

One of the provisions of particular interest to cities, counties and states is that the Federal Government reserves the right to accelerate or postpone any program or projects on which "50 per cent or more of the cost is to be paid from Federal funds, or the carrying charges upon capital cost of which are to be in whole or in part covered by annual contributions by the Federal Government." However, the "right to postpone" does not mean the "right to postpone any such construction activities after construction contracts have been awarded."

This bill calls for stimulation of advance planning by amending the War Mobilization and Reconversion Act of 1944 to increase the $17.5 million dollar planning fund up to a total of 150 million dollars. Senator Murray has invited comments and criticism from persons working in the field of public works and water and sewage treatment.

WHAT RIVER POLLUTION IS COSTING WHEELING, W. VA.*

Experiences in Processing Diluted Sewage Liberally Flavored with Organic Industrial Wastes, in an Attempt to Produce Acceptable Drinking Water from What Was Once the Ohio River

By ARTHUR R. TODD
Supt. of Filtration and Chemist
WHEELING, W. VA.

WE NOW have arrived at the crossroads where we must ask ourselves the question: "Has the Ohio River water become so polluted that it is no longer fit to be used as a source of public water supply?" We at Wheeling have been seriously considering this question for some time but until now we have had a kind of child's faith that something or other would happen to halt the ever increasing pollution of the river. Just what that something would be was not quite clear—perhaps a state or federal law, or a reformation on the part of industries and cities. However, the miracle did not happen and we are face-to-face with the fact that every year since 1826 the Ohio River water has been changing for the worse. For the first 92 years—from 1826 to 1918—Ohio River water was used at Wheeling as pumped—no filtration and no sterilization—although typhoid became very widespread from 1900 on. In the year 1913 there was a big fish kill—so many fish were floating on the river that crowds gathered on the banks to watch the spectacle in awe; oldtimers still talk about it. Very few fish have been able to live in the river since that time.

The Author

*A paper presented before the West Virginia Section of the Amer. Water Works Assn. and published here by permission of the Association.

Chlorination Started

Chlorination was started in 1918 and immediately the typhoid death rate declined. The present filtration and purification plant was put into service in 1925 and the typhoid fever almost entirely disappeared from Wheeling. The few cases that have occurred in the city since then were contracted elsewhere.

From 1925 to 1933 the purification process consisted of treatment with alum, lime and chlorine. The following tabulation shows the increase in chlorine dosage required to produce a chlorine residual of 0.1 ppm.

Year	Dosage, lb./mil.gal.
1918	1.4
1925	2.5
1933	8.0
1939	14.0

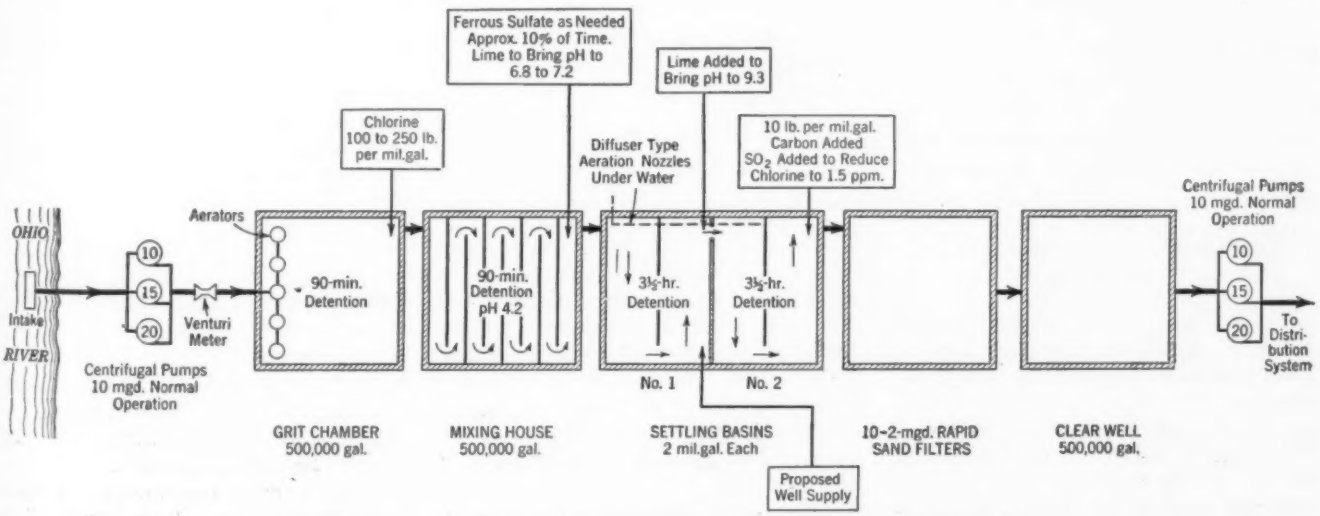
Thus in 26 years the amount of chlorine necessary to produce a 0.1 ppm. residual has risen from 1.4 to 14 lb., or ten times.

The first big taste and odor problem occurred in 1928 and the same problem has recurred periodically. In 1934 the purification chemicals were changed. Ferrous sulfate was substituted for alum, as it was found that the river had sufficient iron salts to require a coagulant only about 10 per cent of the time. Ammonia and pre- and post-chlorination were used with fairly good results for a few years. Carbon was given a thorough try and was included as a regular purification ingredient.

However, when the taste and odor problem would be apparently checked, within a year or two the river would get worse and the trouble would start all over again.

Breakpoint Chlorination; Then Super-chlorination

In 1940 we experimented with "break-point" chlorination. A $3,500 chlorinator was purchased and the process was adopted in 1941. In that year 57 lb. of chlorine per mil. gal. of water were required. For the


Ferrous Sulfate as Needed Approx. 10% of Time. Lime to Bring pH to 6.8 to 7.2
Lime Added to Bring pH to 9.3
Chlorine 100 to 250 lb. per mil.gal.
Diffuser Type Aeration Nozzles Under Water
10 lb. per mil.gal. Carbon Added SO_2 Added to Reduce Chlorine to 1.5 ppm.
Centrifugal Pumps 10 mgd. Normal Operation
OHIO
RIVER
Intake
Aerators
10
15
20
Venturi Meter
90-min. Detention
90-min. Detention pH 4.2
3½-hr. Detention
3½-hr. Detention
No. 1
No. 2
To Distribution System
Centrifugal Pumps 10 mgd. Normal Operation
GRIT CHAMBER 500,000 gal.
MIXING HOUSE 500,000 gal.
SETTLING BASINS 2 mil.gal. Each
10-2-mgd. RAPID SAND FILTERS
CLEAR WELL 500,000 gal.
Proposed Well Supply

Flow Diagram of the Water Purification Plant at Wheeling, W. Va.

next one and one-half years everything was "hunky-dory" and we threw out our chests, contemplating how smart we were. Then came the war. Plants began to operate on three shifts with additional help on each shift, resulting in three times the pollution. Also there were new industries galore. In the all-out war effort very little attention was paid to wastes. The final blow was the start of operation of the butadiene plant at Karbuta, Pa. To meet this situation the purification process had to be changed again. Another $3,500 chlorinator was purchased and installed for super-chlorination. Sulfur dioxide equipment and an 800-cfm. Roots-Connersville air blower were purchased and installed. In addition, a standing order for carbon was placed and the split lime treatment was introduced. The present process consists first of chlorine. The peak summer requirement is 185 lb. per mil.gal. and the winter high is 250 lb. per mil.gal., with a retention period of 90 minutes and a pH of 4.2. The pH is then increased to 7.0 and the retention period increased to three and one-half hours, followed by another increase in pH to 7.5 with another retention period of three hours. The water is then dechlorinated to below 2 ppm. with sulfur dioxide, and carbon is added to stabilize the effluent.

The results of this process are palatable water during May, June, July, August and September, a passable water in February, March, April and October; and a poor water in November, December and January. November is the most troublesome month.

Dropping the pH from 9.3 to 7.5 has greatly increased red water troubles, but when there is a choice between taste and odor complaints, and red water complaints, the latter are preferred.

Costs of Chemicals

Practical plant scale experiments have demonstrated the fact that by using soda ash instead of lime a better tasting water can be produced at any pH above 7.5. Wheeling has hesitated to use soda ash because of the added expense. The tabulation below shows the increase in chemical costs.

Cost per mil. gal.	Fiscal Year
$2.53	1938-1939
2.78	1939-1940
2.92	1940-1941
2.87	1941-1942
3.21	1942-1943
6.58	1943-1944
5.76	1944-1945

Due to the increased pollution of the river water, the rise in cost for chemicals in the past five years is $40 per day to purify the same amount of water.

Prior to the start of operation of the Karbuta plant, the filter runs averaged 63 hours; now the average is 30 hours. Except in the spring, when the water was warm and the solubility of the air in the water was decreasing due to the rise in the temperature of the water, air binding of the filters was unheard of. This week the average filter run might be 53 hours, with no air binding. Next week, due to escaping gases from the water, the filter runs may drop to 18 hours because of air binding. The installation of air release valves on the filter influent line has relieved this situation somewhat. In order to prevent future air binding as the filters are rebuilt, it is planned to install an air release vent in the false bottom of the filters.

Too Polluted to Use?

The answer to the question, "Has the Ohio River become so polluted that it is no longer fit to be used as a source of public water supply?" is "YES." It is true that the Ohio River can be sterilized and it is also true that sewage can be sterilized, but who would want to eat or drink sterilized sewage? The Ohio River is now nothing more than an open drainage ditch. More than a million people empty their waste products into it daily and a few miles downstream other people drink it. No greater fallacy has been foisted on the American public than the old adage, "a stream purifies itself in flowing a few miles." We have finally become realists. No longer do we look for a miracle of a clean, healthy Ohio River, full of fish life, boating and boys and girls swimming.

Since the Ohio River is not water, but diluted sewage loaded with organic and industrial wastes, it becomes evident that the liquid must be treated as such. Mere sterilization by passing it between silver plates is not sufficient; the organic load must be removed. This can be accomplished in three ways. The first is super-chlorination, which is the present process at Wheeling. The second process, now being tried at Weirton, W. Va., is the use of chlorine dioxide. A third would be the installation of a modern sewage plant with primary and secondary treatment of the biological type, whereby the diluted sewage coming down the Ohio River could be processed by first passing it through the sewage plant to remove the organic matter and then through the water treatment plant for further refinement.

Dilute with Ground Water

The Wheeling Water Department is convinced by experience that there is a limit to the load an ordinary rapid sand filtration plant can carry and believes that any additional pollution of the Ohio River will result in a failure to produce a water satisfactory from the standpoint of palatability. In order to meet this ever increasing rate of pollution, it is planned to mix well water with the river water. The plans call for 10 per cent well water this year, based on the increased rate of pollution of the Ohio River each year for the past five years. By 1947, 20 per cent ground water will be required, and by 1949, 30 per cent. The cost of a well equipped to supply 10 per cent ground water will be about $10,000. However, the chemical cost should be reduced by 1 per cent for each 1 per cent of ground water added up to 30 per cent of ground water. Should we use more than 30 per cent ground water, the resulting increased hardness would be objectionable and softening would be required.

Westchester County Flood Control

Under the general supervision of James C. Harding, Commissioner of Public Works of the County of Westchester, New York, John W. Raymond, Jr., of Boston as Principal Hydraulic Engineer, and Charles E. Ryder of Harrisburg, Pa., as Consulting Engineer, a 500 page report on drainage conditions along six Westchester County streams was prepared at the end of the past year. While the streams studied are all relatively small, having drainage areas of from 4.8 to 35.7 square miles, and total only 109 square miles, the areas covered are highly developed and have a population of 296,000 and an assessed valuation of $879,000,000.

The report recommends expenditure of $7,500,000 for construction of various types of flood control work. Included in these works are detention reservoirs, dikes, channel improvements, diversion tunnels, and pumping stations. County regulation of new construction of bridges, retaining walls and buildings in flood plains and special zoning for such areas are also advocated.

This is the same James C. Harding who received the Diven Award Medal of the AWWA for the past year.

A SMALL TOWN WATER MAN GLANCES AT CONSUMER RELATIONS

By E. J. BEAR
Supt., Water and Sewers
LIVINGSTON, N. J.

MUCH has been said and written by water experts and specialists about the chemistry, bacteriology, physics, and hydraulics in water plants, but very little has been said about public relations in those same plants. A water man may be well versed in the science of his profession but be a dismal failure, if his activities are concentrated in a small town, for public relations may be more important than all the technical knowledge he has. He must maintain a sense of humor or become a candidate for a "nut factory."

The Author

What's Wrong with the Water?

Does someone discover a taste in the water, real or imaginary? Is there a break in the water main?—It is the water man's fault. Is there some needed repair on the main and you notify the consumers to draw enough water to last them two hours (twice the estimated time)? "Drat that water man—he's always turning off the water when I have washing to do!" Does somebody's "tummy ache? "It's the water, I'm telling you."

Does a child shut off the water in the cellar, and they call the water office to complain. Is there something wrong with the plumbing? Call the water man, not a plumber. Is it Christmas Eve? Never mind, the water company is pledged to service, so call them up if something goes wrong with your heating system, your toilet, or a water faucet that won't run.

It matters little what the difficulty is in a small town, if it has any connection with the water supply the consumer will call the water utility first. And when there are two feet of snow over a curb box, and no one to help uncover it, the water man must still shut off the water so something in the house can be fixed, and so on, and so on, and so on—day or night, Sundays or holidays, or what have you.

Why Is the Water Bill So High?

How about that high water bill? It's always two or three times as high as usual. And the consumer knows he couldn't possibly have used that much water. "And if you had sufficient intelligence, you would know it too!" If you ask the consumer about leaks, he'll more than likely tell you not to be silly. "Why we had our plumbing checked only recently." "How recently?" "Oh, only recently." Like as not it was two or three years ago.

And there is no rest for the water superintendent at social gatherings with his friends. Some one is sure to plague him with questions of an official nature, and in the back of his mind, he really is worried about some possibility of an emergency occurring at that very minute. A truck may climb a hydrant, a service pipe may break off inside a basement wall; some one may chisel a hole in the service pipe while trying to waterproof the basement; or some power or mechanical failure at the plant is not an impossibility.

Well, how about taking a vacation and getting out of town? Even when he is away, that dread sense of responsibility hangs over him and the vacation, if taken at all, is dampened.

Why Consumers Don't Like Us

Well, maybe it isn't as bad as all that, and maybe all of those things don't happen exactly as they have been drawn above, but that picture serves to show that there is quite often some special animosity toward the water man in a community. Why so? Well for many years, the writer laid it to the contrariness of nature; the natural tendency to blame others for our own mistakes. But now I believe it is really caused by another reason. This idea is not original with me, and I wish I knew who first proposed the idea in an article I read in one of the water works magazines some years ago. That author pointed out that the water company (and its employees) possess a monopoly on a very essential commodity. Now monopolies are something that American citizens do not like in any form whatever. If you don't like the bread, or the milk, or the cut of meat from the butcher's market, you can change your brand, or your butcher, but if you don't like the taste of your water or the price you have to pay for it, "you can lump it," for there is no place else you can go to buy your water. (Bottled water may serve for the table, but it is not useful for any other purpose.)

So let the water man remember that he has to overcome a public prejudice before there is even a complaint. The best way to do this is to act as if there is no prejudice. Furthermore, act as would any good business man; give service to retain the good will of your customers. Don't, above all, act as though you know you have a club over the consumer.

Calming a Complainer

When a man walks into my office with "blood in his eye," I politely ask him to sit down, preferably on the same side of the desk I'm on. If I let him blow off steam, and there's no desk between us, it will do a lot of good. Then, too, I may learn something of importance. Usually, when he is finished with his tale of woe, I agree with him. And I don't agree with him just to take the wind out of his sails. But I usually agree with him because I can see *his* side of the problem. At least I try to see his side. Then I try to make him see my side of the problem. My side is the side of the community as a whole, of all the consumers, of service to all rather than to a few. In fairness he must look at my side of the situation.

It isn't necessary to argue; in fact it is a mistake to do so. At the same time, the water superintendent owes his utility, and his other consumers consideration, and the presentation of their side of the problem. In working from the man's point of view to the other side, it is best done impersonally, and certainly never with an attitude of "Now you listen to me, for I know what I'm talking about." Psychologically speaking, it may be wise to act a little "dumb" as it throws the complainer off his guard, especially if he has been expecting you to come back with a "smart" reply.

This slightly "dumb" attitude often pays off in other situations, especially if it is a case of contractor or tenant trying to put over a concocted scheme. Of course, don't overdo that "dumb" act.

One Last Word or Two

Don't rub it in when you have pointed out your complainant's mistake; it's easy to make an enemy, but more important to make a friend. Remember that fairness is a basis that can lead into no troubles. Realize that you are a public servant, but when some one reminds you that you are working for him, remind him that you are working for 10,000 other persons also and you likewise have their interests to think of. Respect the rights of others, as well as your own, and you will be respected by others. That system pays dividends in a small town. It should pay off in a large one as well.

FLORIDA SECTION'S MEETING*

THE Nineteenth Annual Meeting of the Florida Section of the American Water Works Association was held at the exclusive MacFadden-Deauville Hotel, Miami Beach, November 15, 16 and 17, with 120 members and guests registering.

Chairmen

(Retiring)
G. E. Ferguson
Dist. Engr.
U. S. Geol. Survey
Ocala, Fla.
(New Director)

(Incoming)
C. F. Wertz
Resident Engr.
Department
Water & Sewers
Miami, Fla.

The sessions were opened by addresses of welcome made by Mayor Herbert A. Frink of the City of Miami Beach, and Thomas F. Smith, Director of the Miami Beach Convention Bureau.

New Officers

At a business meeting the following officers were elected for the coming year:

Chairman

C. F. Wertz, Resident Engr., Dept. of Water and Sewers, Miami, Fla.

Vice-Chmn.

H. T. Oberly, Supt. of Distribution, St. Petersburg, Fla.

Secy.-Treas.

A. P. Black, Prof. of Chemistry, University of Florida, Gainesville, Fla.

AWWA Director (replacing W. B. Gibson, resigned)

G. E. Ferguson, Dist. Engr., U. S. Geol. Survey, Ocala, Fla.

Trustees

T. R. Finley, Pittsburgh Meter Co., Orlando, Fla.

R. F. Brennan, Supt. of Water, Daytona Beach, Fla.

A. D. Hutson, Water Department, Gainesville, Fla.

Chairman of Membership Committee

E. K. Phelps, District Engineer, Wallace & Tiernan Co., Orlando, Fla.

*As reported by C. F. Wertz, Chairman of the Florida Section.

The Section voted to continue its efforts toward the enactment of adequate water conservation legislation.

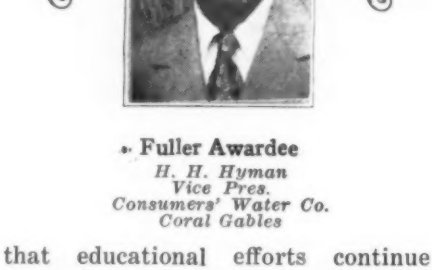
The Fuller Award for 1945 was presented to Henry H. Hyman, Vice-President, Consumers' Water Co. of Coral Gables, Fla. Mr. Hyman is a past-chairman and former director of the Florida Section.

G. E. Ferguson, Chairman of the Florida Section, then reported on the past year's activities of the Section, stressing the work done by the Section and its individual members in helping the Governor put forward legislation covering State Conservation of Water Resources. Although the Water Conservation Bill failed to pass at the 1945 session of the Legislature, Mr. Ferguson urged that educational efforts continue throughout the State so that its passage will be assured in the 1947 session of the Legislature.

Fuller Awardee
H. H. Hyman
Vice Pres.
Consumers' Water Co.
Coral Gables

The Miami Water Supply

C. F. Wertz, Resident Engineer of the Department of Water and Sewers, Miami, described **"Additions to the Miami Water Supply System,"** made during the war years. Work completed or now under construction included some thirteen miles of large cast iron mains, ranging from 30 to 60 inches in diameter, and some fifty-five miles of distribution mains, 12 inches and smaller in diameter; also two new high pressure pumping stations and two wire-wrapped prestressed concrete storage tanks each of 2,500,000 gallons capacity. Plans were described for the enlargement of the water softening plant from 40 to 60 mgd., bids for which will be received in the spring of 1946. The plant is being redesigned to utilize break-point chlorination for color removal. Plans and specifications are also being prepared for a sludge recalcining plant which will have a capacity of 28,000 tons of lime annually. This will be the first large-scale attempt to recover lime at a municipally-owned water plant in this country.



A Demonstration
"Doc" Frederick E. Stuart demonstrates his spectacular Electronic Water Purifier (Electrolytic Coagulator) to Col. Lynn Perry, Engr. of Design, and W. A. Glass, Director, Miami Dept. of Water and Sewers.*

[*We take it the E. stands for Emf.—Editors.]

Vice Chairman
H. T. Oberly
Supt. of Distrib.
St. Petersburg, Fla.

Secy.-Treas.
A. P. Black
Prof. of Chem.
Univ. of Fla.
Gainesville

Military Water Supply

Col. Lynn Perry, Designing Engineer, Dept. of Water and Sewers, Miami, discussed the water supply problems encountered by the Army at Dutch Harbor and throughout the Aleutians.

David B. Lee, Ch. Engr., State Board of Health, Jacksonville, Fla., opened an interesting discussion on military water supply; he introduced **Maj. John Wakefield,** who described some of the sanitation and water supply problems of the Third Army in Europe. Mr. Lee also introduced **R. D. Carnahan, C.M.M.,** who described the driving of large shafts into the sides of mountains on some of the islands in the Pacific from

which were obtained quite satisfactory water supplies.

S. K. Keller, Gen. Supt., Pinellas County, Fla., Water System, described the origin and struggle for the development of the only county-owned and operated water supply system in the State. An impounded surface supply is treated and delivered along some thirteen miles of islands and beach lying between the cities of St. Petersburg and Clearwater, Fla.

Trustee
Ralph F. Brennan
Supt. of Water
Daytona Beach

Programmer
W. W. Gillespie
Cons. Engr.
Jacksonville

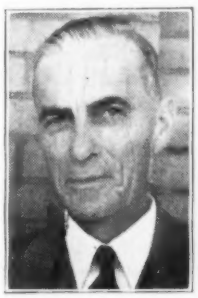
W. W. Gillespie, Cons. Engr., Jacksonville, described the water treatment problems at Sarasota, Fla. The present treatment plant, through zeolite units, softens a well water supply having a hardness of 1,200 ppm. and a sulphate content of 800 ppm. The consulting engineers have recommended that the city secure a new raw water supply from the Myakka River. This will involve the laying of an eighteen-mile transmission main at a cost of approximately $800,000. Since Sarasota cannot finance the complete project at the present time, the portion of the project at the filter plant will shortly be put under construction. New rapid sand filters will be built but will be filled with zeolite and equipped for automatic operation to soften the present well supply.

The AWWA, Air Conditioning, and Water Conservation

Leonard N. Thompson, President of AWWA, and W. W. Brush, Treasurer, opened the Friday session with interesting and informative discussions of Association affairs.

N. C. Ebaugh, Head of the Department of Mechanical Engineering, University of Florida, discussed the use of water in air conditioning, and by means of slides outlined various methods by which conservation of water can be accomplished.

Dr. A. P. Black, Prof. of Chemistry, University of Florida, and Consulting Chemical Engineer, discussed water conservation, and told of the work of the Governor's State Committee on Water Resources and of the legislation which it prepared and recommended. Dr. Black demonstrated by means of graphs and charts why the legislation finally passed—with hardly a resemblance to the recommendations of the State Committee—would not and could not be effective.



Programmers

David B. Lee
Chief Engr.
Fla. Bd. Health
Jacksonville

S. K. Keller
Gen. Supt.
Water System
Pinellas County

New Equipment Developments

At the Friday afternoon session **F. A. Eidsness,** of International Filter Co., Atlanta, Ga., described the development and use of the Stellar Filter, a small unit having been set up for demonstration. This filter uses diatomaceous earth, held on a porous tube by vacuum, as a filter medium. Cleaning is done quickly by discontinuing the vacuum. Also discussed were the probable post-war applications of such a filter.

New Developments

Stellar Filter
F. A. Eidsness
Infilco
Atlanta, Ga.

Elect. Coagulation
F. E. Stuart
Stuart-Brumley
Baltimore, Md.

F. E. Stuart, Pres. of Stuart-Brumley Corp., Baltimore, Md., described the development of a new electronic coagulation unit in which aluminum floc is formed by the passing of a light electric current between aluminum sheets in a cell. A cell having a volume of one cubic foot contains 96 aluminum plates having a total area of approximately 27,000 square inches. Results obtained by the unit on waters from various parts of the country were reported; also preliminary figures on treatment costs and possible applications.

Entertainment

On Thursday evening a cocktail party was held in the Palm Room of the hotel. Singing and dancing were enjoyed to the impromptu music of "Stew" Pizie (Chicago Pump Co., Miami) at the piano. An estimated 125 people attended. On Friday evening 139 persons attended the dinner dance.

N.Y.-N.J. APWA Section Discuss Refuse Disposal

At the last regular meeting of the N. Y.-N. J. Section of the Amer. Pub. Wks. Assn. the topic of refuse disposal was discussed by a panel of experts, under the direction of Eugene Cranch, Dir. of Pub. Wks., New Rochelle, N. Y. The meeting was held at the Engineering Societies Bldg. in New York.

While the discussion was devoted primarily to garbage and refuse disposal, there were several points of general interest to persons engaged in the disposal of municipal sewage. It was the consensus that when garbage is ground in household grinders, the problem then becomes one for the sewage treatment plant operator, although it is not likely that refuse collections can be dispensed with for there are many items not disposable in such a grinder. The thought was also expressed that the use of the household grinders would become gradual but at a greatly accelerated rate over pre-war years.

While sewage treatment works recover and utilize gas, and sometimes process and sell sludge, the incinerator plants, too, can recover salvage of considerable value. In Rockville Center, L. I., for example, the salvage amounts to $15,000 a year.

Sanitary land fills are apparently not very popular as a means of disposal. Fly ash may or may not be a nuisance. The amount of auxiliary fuel depends on the moisture content of the refuse, and is apt to be higher in the late spring and summer when grass clippings and leafy vegetables are a problem. Heat utilization is not generally economically feasible. Truck traffic is often more objectionable than incinerator operation. Cost of operation varies and depends largely on type of equipment, number of men required, and wage scale. Other comments concerned detail of specific plant operation.

DIRECT READING SCALE FOR HELLIGE TURBIDIMETER

By A. A. HIRSCH
State Department of Education
BATON ROUGE, LOUISIANA

INASMUCH as clarity is one of the most important characteristics of a finished water and is readily judged by consumers, its quantitative measurement should be an essential part of the control routine in all well-managed filter plants. Residual turbidity in the applied water to the filters should also be measured as it may reveal a need for varying the coagulant

Fig. 1—Hellige Turbidimeter

feed, or reflect the conditions within the settling basins, or indicate the extent to which floc is depreciated in passages to the filters. In short, turbidity tests regularly run on filter influent and effluent furnish a sensitive index to many details of plant operation which would escape notice otherwise, and thus engender more satisfactory filter performance.

For the determination of turbidity in the relatively clear water range, down to zero turbidity, several instruments have been offered, but for the usual needs of the plant operator the Hellige turbidimeter is regarded as the most practical type of those presently available. This device does not involve standards either liquid or disc, but measures turbidity by balancing two different optical effects of the sample itself. The cut in Figure 1 shows a perspective view of this instrument.

Principle of Operation

Light from a pear-shaped internally white-coated 60 watt, 115-120 volt bulb strikes the water sample along two

The Author

paths. Some of the light is reflected from a glazed white porcelain surface to impinge on the test cell laterally, causing reflection from the dispersed particles suspended as turbidity in the water. This action is an application of the Tyndall effect. The other light path is through an adjustable width slit, controlled by the radio knob on the side of the cabinet, to a pure white reflector disc, set at a 45 degree angle under the sample platform. Its reflected ray passes through a hole in the platform, centrally up through the test cell. In the eyepiece an observer views a central spot, variably illuminated by the directly transmitted beam, surrounded by an annular field, of fixed intensity, as caused by side-wise illumination and internal reflection. When taking a measurement, the amount of direct illumination through the slot is varied until the intensity of the central spot matches the surrounding field in the eyepiece. If the water is absolutely clear, that is, no particles in suspension, there will be no reflected light across the cell, and the whole field in the eyepiece, at a match, will be black. From the reading on the dial, the turbidity of the sample is obtained on a calibration curve, furnished by the

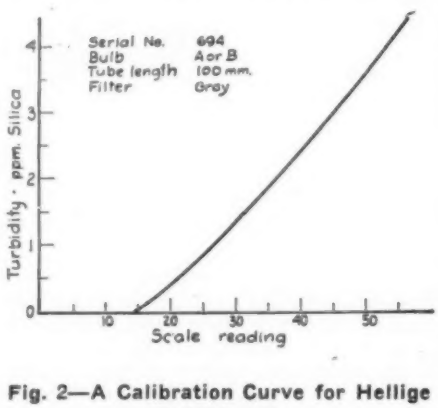
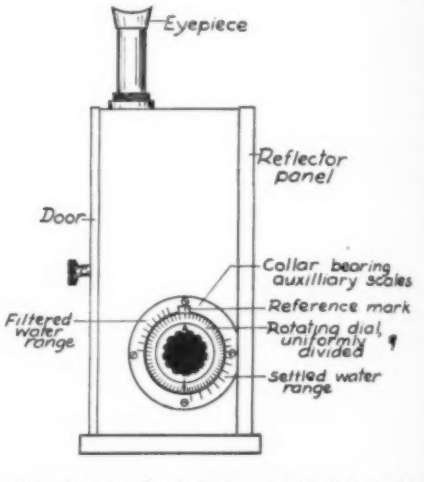


Fig. 2—A Calibration Curve for Hellige Turbidimeter

manufacturer. A wide range in turbidity, from 0 to 150 ppm. on the silica scale, can be covered by use of light filters and various depths of cells.

Attached Scale

Rather than refer to a calibration curve, which may be almost linear, such as reproduced in Figure 2, or decidedly curved; or using tables prepared there-



Hellige turbidimeter, dial side, with attached direct-reading scales on annulus for evaluating settled and filtered waters

Fig. 3—Dial Side of Hellige Turbidimeter With Attached Direct Reading Scales on Annulus

from, turbidity values may be more readily obtained by mounting a direct-reading scale on the side of the cabinet, encircling the radio knob, as illustrated in Figure 3. The divisions of this scale are obtained from the original calibration curve which plots turbidity against dial position for that particular instrument. As it is desirable to cover the two separate ranges corresponding to filtered and to settled waters, two separate scales are scribed on the annulus, and two pointers painted on the rotating dial to correspond. Details of the cut-out from a piece of sheet aluminum are reproduced full-scale in Figure 4.

As each instrument is calibrated individually against standard suspensions, the curves so furnished must be used for dividing the auxiliary scale. Thus the scale divisions in Figure 4 apply only to instrument No. 694. Calibrations vary with each specific instrument because of variations in reflector panels, internal reflection characteristics in the cabinet, details of the diagonal reflecting disc, and the black ab-

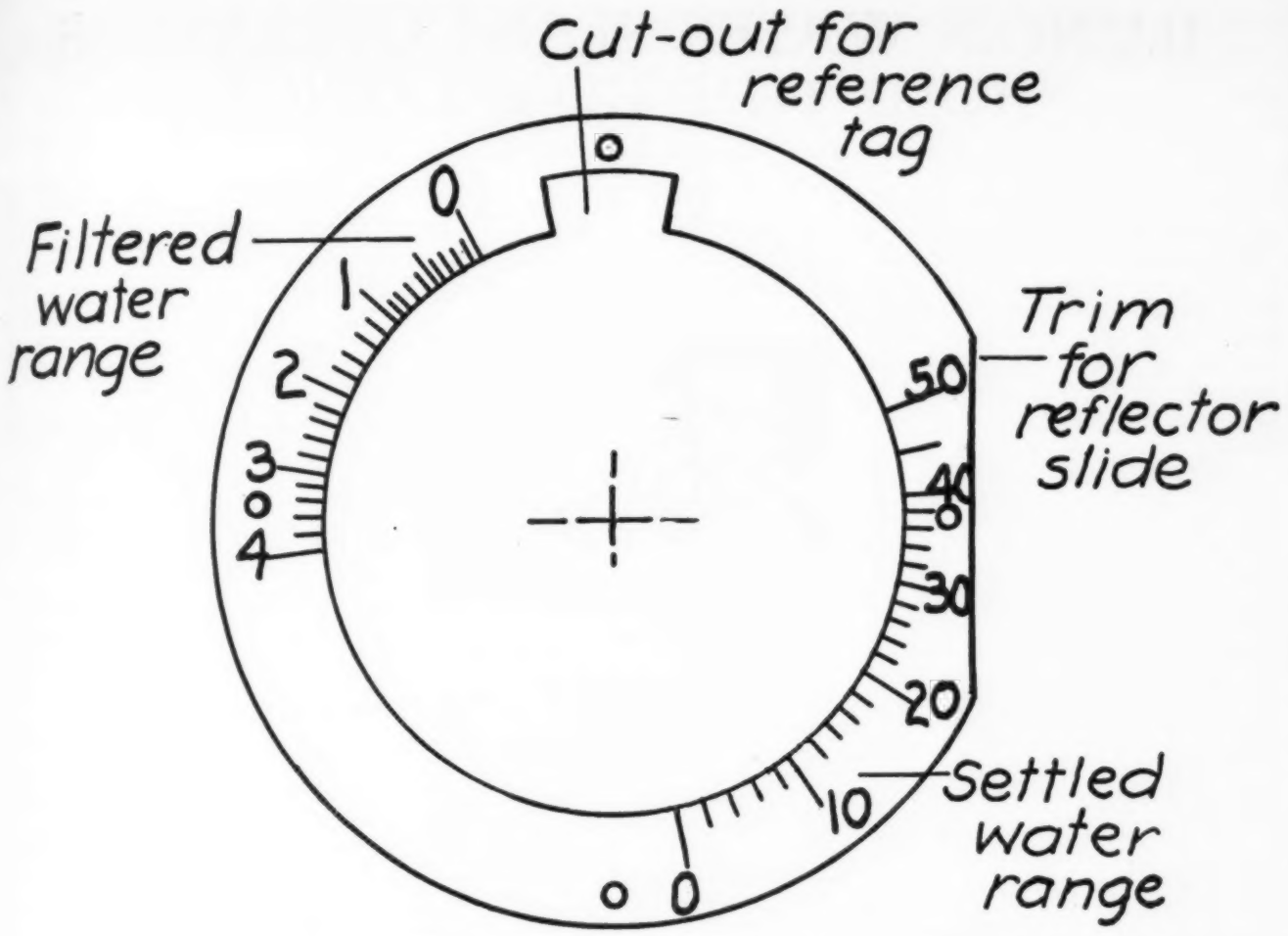


Fig. 4—Pattern for Annulus, Showing Calibrations of Direct Reading Scales and Location of Cut-outs.—Reproduced in Actual Size

sorption felt set just under the eyepiece. Not much difference is caused by interchange of the same type light bulbs, since the principle of the optical balance is based on partition of light from an identical source. Bulbs with unsymmetrical filaments should be marked for positioning in a constant manner.

The annular scale is attached by self-tapping screws or small bolts. Its placement does not prevent use of the dial divisions and calibration curves originally supplied, and therefore in no way interferes with the other functions of the instrument, such as turbidity measurements of raw water, or determination of sulfates. If desirable, additional scales may be scratched on the outside of the periphery of the annulus for these other tests.

Some Changes Down in Texas

Hunter Goes to Lubbock—Hoefle, Dallas Superintendent

Within the last month or so there have been several changes down Texas-way, Homer A. Hunter, Ass't City Manager and Water Works Superintendent of Dallas, Texas, has become City Manager of Lubbock, Texas. Hunter, Sup't of the Dallas Water Department for several years, is well known for his "25 Year Master Plan," a noteworthy post-war planning program for Dallas.

Homer A. Hunter

To replace Mr. Hunter as Superintendent of the Water Department, K. F. Hoefle, who has been Ass't Sup't for a number of years, was appointed to the position. He has been associated with the City of Dallas since 1924.

Coincident with these changes was the official appointment of V. R. Smithen, who has been Acting City Manager of Dallas, to the position of City Manager to fill the vacancy created by the resignation of Col. James Austin, who has been absent on leave. J. C. Bissett has been appointed to replace Mr. Hunter as Ass't City Manager of Dallas.

Waste Utilization

Current developments in waste utilization are being discussed in *Industrial and Engineering Chemistry* (*Industrial Edition*) by Harold R. Murdock. These discussions are of particular interest to persons in the field of sanitation, and Mr. Murdock, a consulting chemical engineer, is well acquainted with the problems involved. In the December issue the subject discussed was lagoons, and their use in treating wastes. Retention Lagoons, Absorption Lagoons and Processing Lagoons are all discussed briefly and succinctly. Other issues have discussed other subjects pertinent to the waste treatment field. *Industrial and Engineering Chemistry* is published by the American Chemical Society, Washington, D. C.

ILLINOIS WATER PLANT OPERATORS HOLD 14TH CONFERENCE

SPONSORED by the Division of Sanitary Engineering of the Illinois State Department of Public Health, the Illinois Water Plant Operators held their 14th annual conference at the Leland Hotel in Springfield on December 5 and 6, 1945. Approximately 300 persons attended.

The meeting was opened with welcoming remarks by Clarence W. Klassen, Chief Sanitary Engineer of the Department of Health. It was a two-way welcome; Klassen welcoming the operators to the annual conference and the operators welcoming Klassen back from nearly four years' service in the Sanitary Corps of the Army. Presiding over the sessions was Vice Chairman E. M. Craig, Supt. of water at Zion.

Business Session

New officers elected for the ensuing year are:

Chairman
E. M. Craig, Superintendent
Water Dept., Zion, Ill.
Vice Chairman
L. S. Doren, Gen. Mgr.,
Pekin Water Co., Pekin, Ill.
Secretary
Herman Garner, Superintendent
Water Dept., Benton, Ill.

During the business meeting a rather active discussion took place on the subject of legislation to license water works operators. A previous attempt having failed, it was believed that a second try should be made as opposition of various agencies was reported to be diminishing. A committee was appointed to go into the matter before the next meeting. Included in the committee were H. A. Spafford of the Department of Public Health, K. B. Narams of Eldorado, and Joe Sandy of Georgetown with two members yet to be appointed.

Operator's Award

Mr. William J. Schwalb of Freeburg, Illinois, was the recipient of the operator's award trophy. It was his third try for the award which is based on a written report covering the operation of the water works for the previous year.

In order to compete, however, the operator must not only submit a report, but he must also (1) hold a certificate of competency as a water plant operator from the Department of Health; (2) be submitting regular monthly operating reports to the Department; and (3) attend at least one water works operators' meeting a year. (This meeting may be a meeting of the Operators' Conference, a meeting of the Illinois Sect. AWWA or a meeting of the North Shore Water Producers.) The winner does not obtain permanent possession of the trophy, as it is passed on each year.

Sponsor
C. W. Klassen
Chief Engr.
Ill. Dept. Health
Springfield

Chairman
Erwin M. Craig
Supt. of Water
Zion

Chlorination in General

Speaking on the subject nearest his heart, **A. E. Griffin,** of the Technical Division of Wallace & Tiernan Co., reviewed the history of chlorination practices, defined terms, and explained the application of chlorine to water works problems.

Among the terms defined were marginal chlorination (to the margin of a residual irrespective of type of residual), residual chlorine, false residual, manganese residual, break-point chlorination, etc. In defining residual chlorine, Mr. Griffin explained the various tests for residual, emphasizing the ortho-tolodine-arsenite test as the best one available for differentiating the type of residual present.

Break-point chlorination was defined as the application of chlorine to water to produce and maintain essentially free available chlorine residual to the exclusion of combined chlorine residual. Free active residual chlorine beyond the break-point, at which point the ammonia is destroyed, will approach a sterilizing condition. Beyond the break-point, manganese will be oxidized at any pH, color will be removed and algae cannot live.

Break-point chlorination should preferably be used ahead of filters with a 30-minute contact. It will aid coagulation, increase filter runs and cure tastes and odors. Free chlorine has no taste (or odor) up to 4 ppm.

Programmers
Wm. J. Downer
Asst. Ch. Engr.
J. G. Weart
Chemist
Illinois Dept. of Health
Springfield, Ill.

State Mutual Aid in Action

Now that the war is over, one may look back at the workings of mutual aid and appreciate the need for its continuance in peace time. As examples of the workings of mutual aid, **A. E. Anderson,** City Chemist, cited several instances in Moline where he was the Zone Coordinator.

In one case, laboratory tests indicated contamination; in another the need for a chlorinator was shown; in a third when the pump failed a water tank truck was supplied and the Boy Scouts distributed hand bills explaining the trouble.

When one city lost its chemist to the draft, Moline ran the tests and took over control of the supply. Moline itself received help when it had a 20-inch main break.

Operation Records

The value of operation records has been proved at Pekin, according to **L. S. Doren,** Gen. Mgr. of the Pekin Water Co. Among the operational records kept are daily records of each well, its operating time and metered discharge, amount of chlorine used and static levels. On the distribution system all valves, crosses and tees are recorded. Records are kept of leaks, services and meters which are tested every 4 to 5 years; inventory records are also maintained.

In another plant of this company, at Pontiac where softening is used, records are kept of chemical dosage, laboratory analyses, filter operation, pump operation and others.

Two Supers

R. P. Blystone
Supt.
Water & Sewage
Sullivan

Roy C. Graves
Supt. Water
Anheuser-Busch
St. Louis, Mo.

Mr. Doren said that there are three reasons for keeping records on water works operation:

(1) To provide the operator with information on operation and efficiency.

(2) To serve as a barometer of production.

(3) To prevent misunderstandings with the consumer.

Surplus Property

In the absence of W. Scott Johnson who was scheduled to speak on "Public Health and Your Water Supply," **Major L. J. Murphy**, U. S. Public Health Service, Chicago, spoke on the matter of Surplus Property.

With changes in the rules and regulations occurring regularly, it is unimportant to record the details presented at that time but certain long range ideas still apply as this is being written.

For one thing, prepare a list of needed property, contact the nearest USPHS office for advice on where to go to get the material, and have your name placed on the mailing list of the agencies handling surplus property. These include the RFC, FWA, FPHA, and the Army and Navy themselves, among others.

Solving Distribution Problems

"Problems in distribution systems may be divided into five classes: design, financing, operation, maintenance, and cost accounting." So spoke **C. M. Roos,** Gen. Mgr. of the East St. Louis and Interurban Water Co. of East St. Louis, Illinois.

Design problems result from the fact that most systems just grew. There was no definite plan because there was no foreseeable future.

Financing problems come from lack of planning. There must be some plan looking toward future service. Too often, too much money is expended in laying mains that will serve a relatively few customers in the future. Such planning shows lack of foresight.

Operation problems include such small items as the consumer who doesn't understand that flow of water and pipe size are interdependent. Then there are the problems inside the consumer's property line, change in fire flow conditions, drainage of fire plugs and hydraulic conditions that set up bad distribution.

Mr. Roos said that the war had forced many water plants to investigate conditions and that was a good thing, for to give good service a water works operator has to know the laws of hydraulics and how they operate in his system. (Mr. Roos added

More Programmers

L. S. Doren,
Gen. Mgr. Pekin Water Co.
C. M. Roos,
Supt. E. St. Louis Water Co.
A. E. Anderson,
Chemist City of Moline

that one didn't have to be a hydraulic engineer; he could obtain the necessary information from tables, handbooks and reference articles in the technical magazines.)

Maintenance and depreciation problems are often caused by the chemical properties of the water, which contribute to corrosion and tuberculation, etc. Perhaps the best gage of the depreciation of a distribution system is the unaccounted for water, which should be kept below 15 per cent. Determination of the drop in the C value of pipe lines is another indication of depreciation of pipe lines, as is change in pressure throughout the system.

Cost accounting problems include costs of operation, maintenance, replacements, and new installations, all four of which must have adequate accounting or add to the burden of good management.

In closing his talk, Mr. Roos called for comments from the floor. Among those responding was **Carl Duy,** Superintendent of Aurora, who told of old lines being laid 3 inch, to which was added a four-inch line, to which was later added another section of 3-inch lines again. Mr. Duy is also troubled by finding that services to consumers were replaced without cutting off the old service, but leaving it to leak as fast as it could.

In answer to a question, Mr. Roos said that large users were metered and when a large meter user questioned the service or loss of head through the meter, the company placed a recording gage on each side of the meter, and a meter master on the line to show just what took place in that particular plant.

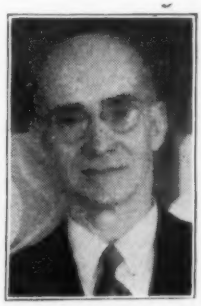
W. R. Gelston, Superintendent of Water, Quincy, pointed out that the next size pipe was cheaper in the long run. Gelston has noted that in house services where the line changes from galvanization to brass, there is a tendency to form a tubercle, thereby restricting flow. Mr. Gelston asked what should be considered an adequate pressure (the answer given was 40 to 50 psi.) and suggested that the water works men should cooperate with the master plumbers' association in developing plumbing equipment that would meet the requirements of good and safe practice.

F. H. King, Manager of the Alton water works, told of some of the problems in a city of varying elevations and how a combination of high pressure (150 psi. at the plant) and elevated storage overcame some of the difficulties.

Clifford Fore of Carbondale suggested the running of velocity flow tests at fire hydrants after flushing in order to know what flow conditions actually existed.

Laboratory Sessions and Round Table Discussions

On the second day of the meeting the group was given laboratory demonstrations and round table discussions were conducted by members of the Illinois State Department of Health.



Danville Boys

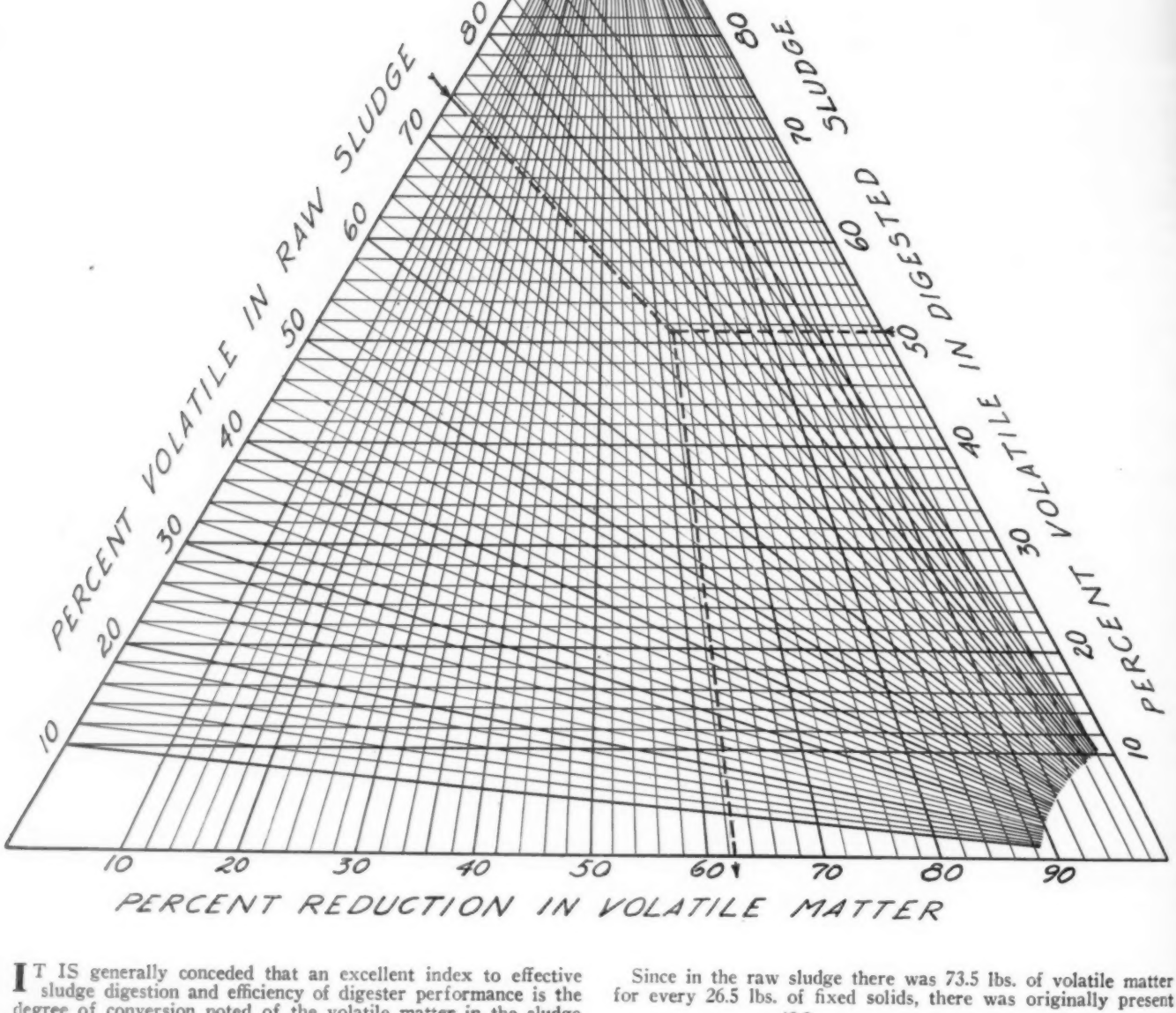
K. A. Biddle
Chemist

W. G. Clink
Chief Engr.
Interstate Water Co.
Danville

CHART FOR DETERMINING PER CENT SLUDGE DIGESTION

FRED H. BURLEY, Supervisor

Sewage Treatment Plant, Detroit, Mich.



IT IS generally conceded that an excellent index to effective sludge digestion and efficiency of digester performance is the degree of conversion noted of the volatile matter in the sludge passing through the digesters. The degree of conversion is best expressed as per cent reduction of volatiles entering in the form of raw solids.

Volatile matter converted during anaerobic digestion is either evolved as gases or remains in the mother liquor (supernatant) as soluble organic or mineralized substances. The amount of gas produced is variously estimated at from 16 to 20 cu. ft. per pound of volatile matter converted.

The writer has found frequent computations of per cent reduction of volatiles on this basis to be a valuable check on digester efficiency, particularly so when considering the average figures for volatiles in the raw and digested products on the dry basis, from which the true reduction can be computed according to the following example. Assume:

	Volatiles	Fixed
Raw sludge	73.5%	26.5%
Digested	51.2%	48.8%

Since in the raw sludge there was 73.5 lbs. of volatile matter for every 26.5 lbs. of fixed solids, there was originally present in the raw sludge $\frac{48.8}{26.5} \times 73.5 = 135.4$ lbs. of volatile matter for every 48.8 lbs. of fixed solids. Therefore, the actual reduction is $135.4 - 51.2 = 84.2$ lbs. of volatile for every 135.4 lbs. entering as raw sludge. The reduction on a per cent basis is, therefore,

$$\frac{84.2}{135.4} \times 100 = 62.2 \text{ per cent.}$$

As a time-saver the accompanying chart was developed. It is simple to use. The arrows and dashed lines indicate the manner in which the per cent volatile in the raw and digested sludge (taking the above example) is located on two sides of the chart and the lines followed toward the opposite apex and parallel to the base, respectively, to their intersection. The line projected from this intersection to the base reveals the percentage reduction in volatile matter.

PURDUE'S SECOND INDUSTRIAL WASTE CONFERENCE

UNDER the direction of the School of Civil Engineering, Department of Sanitary Engineering, and the Technical Extension Division, Purdue University held its Second Annual Industrial Waste Conference.

Chairman
Don E. Bloodgood
Prof. San. Engr.
Purdue Univ.

Host
R. B. Wiley, Head,
School Civ. Engr.,
Purdue Univ.

Credit for the success of the meeting again goes to Prof. Don E. Bloodgood, Assoc. Prof. of Sanitary Engineering at Purdue. Attendance at this second conference topped 250. Approximately 48 per cent of the registrants were representatives of industries in Indiana; representatives of governmental agencies and municipal water and sewage works accounted for 25 per cent of the registration; educators and students (not all from Purdue), made up approximately 13 per cent of the registrants, while equipment manufacturers' representatives (less than 10 per cent) and consulting engineers (less than 4 per cent) made up the remainder. At least a dozen states were represented in the attendance.

In welcoming the opening session, **Prof. R. B. Wiley,** Head of the School of Civil Engineering, reviewed briefly the anti-pollution laws of the State and the work of the new Stream Pollution Control Board which since its inception in 1943 has issued 37 orders to municipalities and seven to industries to treat their respective wastes.

Prof. Wiley also commented on the formation of a Sanitary Engineering Research Advisory Board at Purdue University, sponsored by Anton Hulman, Pres. of the Clabber Girl Baking Powder Co., of Terre Haute, Ind. It is the purpose of this board to attract industrial cooperation and sponsorship of waste treatment projects at Purdue Univ. The program is getting under way with studies being made on strawboard wastes, brewer's hops, anthracite filters for milk waste treatment, and metal plating wastes.

Industrial Wastes— What Are They?

As the opening theme of the conference, **Dr. George E. Symons,** Assoc. Editor, *Water & Sewage Works,* set up a broad and basic definition of industrial wastes. "Industrial waste is any material or energy discarded by industry in the production of some useful product or process, regardless of whether the discharge is to the atmosphere, the land. or to bodies of water, and regardless, too, of whether the discharge has any present or potential economic value or is in any way deleterious to the receiving medium."

Having a basic and broad definition, it becomes possible to classify wastes according to deleterious nature, recoverable by-products, effect on receiving medium, treatment required, or in any other category that may aid in study. From such classifications come the answers to the questions of which wastes to treat, what to recover, cost of treatment, and so forth.

Industry must recognize the fact that waste treatment must be considered as part of legitimate production costs, and waste treatment plants as part of the capital structure. Where industrial wastes are discharged into sewers, industry must be prepared to pay its fair share of the cost of handling those wastes in the municipal sewage treatment plant.

"Industrial Wastes — What Are They? They are the problem of today, and they will be the curse of Tomorrow, unless we (to paraphrase Shakespeare) take up arms against this sea of problems, and by opposing, end them."

Grease Recovery From Meat Packing

It is impossible to generalize as to the amount of grease or fat that will be recovered from each animal, according to **E. N. Mortenson,** Chemical Engineer, Swift and Co., Chicago. For example, beef will run from 11 to 30 per cent fat, and the edible portion varies as well.

Recovery of grease in trap or separators may run from ½ to 2 lbs. per 1000 lb. of live kill. The loss of flotable grease can be kept at a minimum of 0.1 lb. per 1000 lb. of kill, in a well operated plant.

Grease separators should be designed to give at least one hour detention allowing from 0.5 to 1 gal. of water per 1000 lb. of kill. In the design of separators full consideration should be given to the fact that 75-80 per cent of the volume of water used, leaves the plant during the daytime.

Baffles do not help, except at the inlet end to distribute flow. The capacity must be such that the maximum rate of discharge will not cause a linear velocity of greater than 2 ft. per min., preferably 1 ft. per min.

Depth of the tank is not so important, but a good skimming device is, and provision must be made to remove the sludge at regular intervals in order to maintain efficiency of the trap. Simple sedimentation is the best method found; air flotation is no better, and treatment with acid to PH 4.7 sends the fat to the sludge from which there is now no practical method of recovering it.

Disposal of Pickling Liquor Waste

While the steel industry is continuing to grow and develop, it has not yet found a profitable by-product from its most objectionable waste, spent acid pickling liquor. **R. D. Hoak,** Senior Fellow, Mellon Institute, told the convention of the

Programmers

B. A. Poole
Director
Div. Envir. Sanit.
Indiana Bd. of Health

Jos. J. Gilbert
Sales Engineer
San. Engr. Div.
Link-Belt Co.
Philadelphia, Pa.

latest experimental work being done on the "Disposal of Spent Pickling Liquors."

All present methods of treatment are merely temporary until better procedures are available. Lagooning and lime treatment are most popular at the moment, although liming costs approximately one cent per gallon of liquor treated.

The total market for ferrous sulfate is but 4 per cent of the total that could be recovered.

Recovery of acid and ferrous sulfate by differential solubility in acetone is successful but requires expensive equipment and an inflammable solvent. Mr. Hoak also mentioned half a dozen other methods of treating spent pickle liquor and the difficulties of each.

Work Shops

The success of the *Work Shop* idea at the first Purdue Waste Conference was reason enough for a continuation of that feature. Some idea of the scope of the problems discussed may be evidenced by a brief recitation of a few of the topics gleaned in a tour of the various group gatherings.

On the subject of *Milk Wastes*, interest was centered in how milk companies could pay for their share of the treatment of milk wastes dumped into municipal sewers.

The session on *Food Processing Waste* considered dehydration as an item of prime interest, while *Fermentation Process Wastes* were considered as sources of methane gas in anaerobic digestion treatment.

Strawboard wastes, among others, were considered in the work shop on *Paper Manufacturing Wastes*.

In the work shop session on *Metal Plating and Steel Mill Wastes* it was stated that "one of the greatest deterrents to progress in waste treatment by industry was and is the lack of understanding of industry and governmental agencies."

It was interesting to note that in this session as well as the work shop on *Sewage Treatment and Industrial Wastes* the question of the effect of chromium wastes on sewage treatment received considerable discussion. Unfortunately there was no clear cut opinion stated. In one instance less than 1 ppm. of chromium was charged with causing bulking in an activated sludge plant while another found that chromium aided in reducing scum in digesters and still another found no effect whatever.

Industrial Waste Disposal in Europe

Following the banquet at which the new President of Purdue, **Dr. F. L. Hovde,** was presented (this being his first official banquet), **Lt. Col. J. J. Gilbert**, Asst. Dir. Sanitary Corps of the U.S. Army, gave an illustrated talk on his inspection of sewage and waste treatment plants in Germany. Items of special interest besides the extent of the destruction by bombing, were methods of treating cyanides, chromium wastes, pickle liquor, phenol wastes, and acid wastes.

Conservation

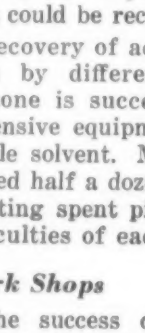
Dr. W. E. Howland, Prof. of Sanitary Engineering, Purdue, gave an eloquent plea for "Conservation of Natural Resources." Prof. Howland approached the subject from the logical viewpoint of the engineer and scientist, believing that "Conservation is optimum use with minimum waste." True conservation envisages the saving of power, and preventing loss of usable products as well as the prevention of the depletion of natural resources by wasteful production.

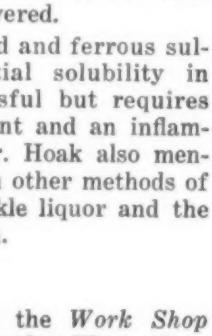
With this thesis Dr. Howland examined the subject of what he, as a professor of engineering, could do to teach the fundamental concepts of sound conservation. Expressing the necessity for the use of common sense in the matter of the use without abuse of our natural resources, Dr. Howland spoke of the threatened depletion of those natural resources.

Canning Wastes

Surprising as it may seem, there is nearly twice as much waste from the dry vegetables as there is from the processing plants which can them. In a talk on "Canning Wastes and What Can Be Done With Them", **Dr. R. Henry Morris, III**, In Charge Development Section, Chemical Engineering, U.S. Dept. Agr., Philadelphia, called attention to the above fact.

While this fact does not minimize the strength, amount, or difficulty of treatment of processing wastes,

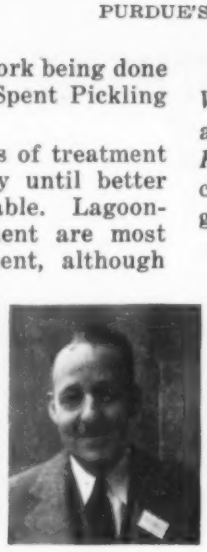


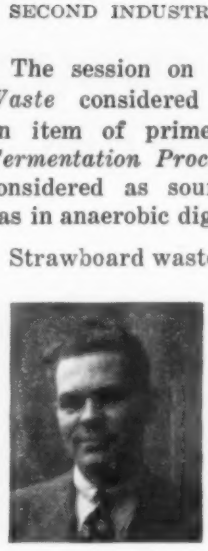


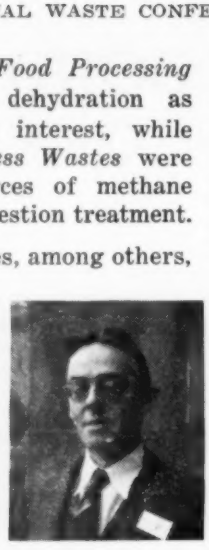
More Programmers

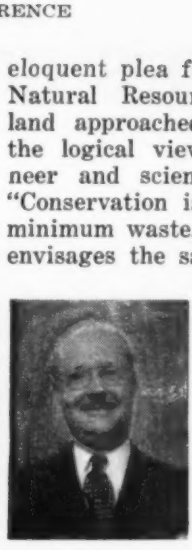
Rich. D. Hoak
Senior Fellow
Mellon Inst.
Pittsburgh
(Pickle Liquor)

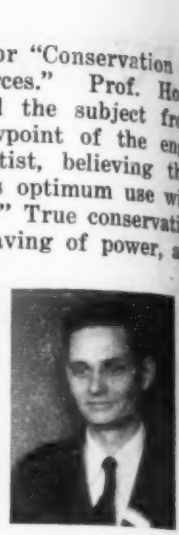
Major
M. Le Bosquet, Jr.
Sanitary Engr.
U.S.P.H.S.
Cincinnati, O.











Program Participants

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Swift & Co.
Chicago

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Philadelphia

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Stolle Corp.
Cincinnati

B. H. Nissen
Chief Chem.
Anheuser-Busch
St. Louis

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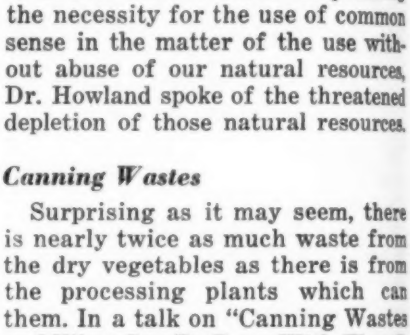
Assoc. Editor
"Water & Sewage Works"
New York

W. E. Ricker
Assoc. Prof.
Dept. Zoology
Indiana Univ.



Indiana Sparkplugs

Anton Hulman, Chair., Flood Control Com.
Joseph Quinn, Chair., Ind. Sec., AWWA
Dr. L. E. Burney, Ind. State Health Com.

Purdue's San. Engr. Research Board Attends Conference

Front row, left to right—Dr. A. A. Potter, Dean of Engineering; Anton Hulman, Pres., Hulman Co., Terre Haute, and Chairman of the Board; Prof. R. B. Wiley, head of the School of Civil Engineering.

Second row—Joseph L. Quinn, Vice-Pres. of the Terre Haute Gas Co. and Vice-Chairman of the Board; W. W. Mathews, Supt. of the Gary Sewage Treatment Works; Prof. Don. E. Bloodgood, Assoc. Prof. San. Engr.; Dr. W. E. Howland, Prof. San. Engr.

Third row—B. A. Poole, Chief Engineer, Indiana State Board of Health; L. S. Finch, Chief Engineer, Indianapolis Water Co., and M. H. Schwartz, Supt. and Gen. Mgr., Vincennes Water Co.

it does show that there is another problem in canning plants, a problem that a stream pollution survey often does not uncover. Fortunately, these vegetable tops, husks, leaves, roots, and stalks do not clutter up our streams and fortunately, too, they have a commercial value as poultry feed when properly dried.

Brewery Waste

In a paper on "Brewery Waste Utilization", **B. H. Nissen,** Chief Chemist, Anheuser Busch, St. Louis, pointed out that for the most part brewery wastes were dilute, and created no great problem in sewage disposal systems. Nevertheless, such wastes as do exist, as for example the waste hops, and the pressed liquor from the malt may be troublesome and do need study in handling.

Metal Plating Wastes

William Ehlen, Chief Chemist, Stolle Corp., Cincinnati, left no doubt as to the complexity of "The Composition of Metal Plating Wastes." Treatment of such wastes is not simple and proper treatment is as yet often unknown. Too often, batches of waste or of obsolete baths are dumped to the sewer without realization of the effect on sewage treatment works. One of the simplest immediately available means of handling this problem is to construct holding tanks which will allow the discharge of these toxic wastes at rates low enough not to interfere with sewage treatment processes or harm aquatic life.

Public Health

Dr. L. E. Burney, Health Commissioner of the State of Indiana, had considerable of interest to say on "New Developments in Public Health," and commented on the newly organized State Board of Health, which consists of nine members including doctors, dentists, nurses, a sanitary engineer (Prof. Bloodgood) and a layman. With staggered terms and varied professions and talents, politics and narrowness of vision are a thing of the past as far as Indiana's Board of Health is concerned.

Milk Waste Treatment

L. F. Warrick, Chief Engineer Wisconsin State Board of Health, Madison, Wis., presented an illustrated talk on "Milk Waste Treatment, Past, Present, and Future." Motion pictures showed the different types of treatment for different wastes, including open trickling filters, high rate filters, activated sludge, as well as chemical treatment. The program of milk waste utilization has now become one of national scope and rapid strides are being made.

The U. S. Pub. Health Service and Industrial Wastes

Speaking for and about the work of the U.S. Pub. Health Service in the matter of industrial wastes, **Maj. M. LeBosquet, Jr.** presented a paper co-authored with **S. R. Weibel,** also of the Cincinnati office of the U.S.P.H.S.

Based on the Ohio River Pollution Survey (see editorial on page 400 of the Dec., 1945, issue of *Water Works & Sewerage*) and the results of the investigation of some 1800 plants, Maj. LeBosquet said that any industrial waste survey must consider the following points:

1. What portion of the wastes can be treated with sewage?
2. What portion must be treated independently?
3. What portion requires further research?
4. What costs are involved to increase the municipal sewage works in order to handle industrial wastes?
5. What costs are involved in industrial pretreatment or complete treatment plants?

Major LeBosquet then gave the results of their findings in the Ohio River Basin Survey.

Effect of Industrial Wastes on Aquatic Life

Perhaps a particular waste may not have any effect on fish themselves, but it may affect some organism in the aquatic cycle, and by eliminating that organism, so disrupt the cycle that fish will disappear from the stream. The effect of some industrial wastes on algae and other aquatic organisms was discussed in a paper by **W. E. Ricker,** Assoc. Prof., Dept. of Zoology, Indiana University, Bloomington.

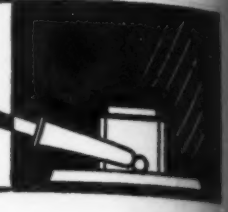
Other Topics

In the absence of three other speakers, their papers were read. The paper, "Plain Thinking About Industrial Wastes," by **Morris Cohn,** Editor of *Sewage Works Engineering,* was read by Cecil Calvert, Supt. of Filtration, Indianapolis Water Co. Mr. Cohn expressed the opinion that industry should accept waste treatment as a part of production costs.

The paper on "Developments in Paper Mill Waste Disposal" by **Dr. Harry Gehm** and **Don. E. Bloodgood,** was read by Dr. W. W. Hodge, Senior Fellow, Mellon Inst. Messrs. Gehm and Bloodgood outlined the complexity of the waste paper mill waste problem and progress to date.

The paper on "Economies in Industrial Waste Treatment Plant Design" by **B. A. Poole,** Dir. Bur. Environmental Sanitation of Indiana, stressed the fact that municipal waste treatment plants need a larger factor of safety than do industrial waste treating plants, and therefore the latter can be constructed with greater economy. (G.E.S.)

The Editor's Comments



What About Patents?

The matter of patented processes and equipment and patents covering a combination of processes and equipment has recently proved perplexing, if not actually annoying, to engineers and chemists in the field of water and sewage treatment—more particularly to designing engineers of sewage treatment works.

Sewage works engineers experienced their first real impact with the process patent situation in the case of the Activated Sludge Process. U. S. Courts declared the patents covering this widely adopted process to be valid, and municipalities employing the process without prior agreement with the plaintiff patent holders have been held to be infringers.

The Milwaukee test case on the Activated Sludge Process was long and strenuously fought by the city, aided by a battery of experts in the sewage field, but in the end the municipality was adjudged an infringer of a valid patent. Although the plaintiffs were awarded damages in the amount of almost $5,000,000 this case was finally settled for something less than $1,000,000 for use of the process. Now it is learned that the Sanitary District of Chicago has just recently lost its case in which the plaintiff has been awarded $950,000. According to Chicago authorities the case is to be appealed.

In addition to commenting on this turn of affairs in his pithy annual review of developments in sewage treatment, featured in this issue, Dr. Mohlman discusses the interesting improvements in trickling filter design and methods of operation of this highly useful and robust treatment device in England. Concerning this development, he remarks that whereas it is already difficult to evaluate the relative merits of the several designs and combinations of operating schemes employed, such will be all the more so "i presented by equipment companies eager to promote new and competitive processes."

The latter comment by Dr. Mohlman will lead many to recall that up to a few years ago the consulting or designing sanitary engineer was required to take but little cognizance of the patent situation when choosing methods and designing sewage treatment plants for governmental subdivisions, whereas today the situation is quite different. The sanitary engineer of today is, on the other hand, confronted at many turns with the important question of possible patent infringements. He must know how to proceed in order to avoid such infringements, and what course to pursue when evaluating claims of purveyors of patented processes or those of competing equipment companies who offer patented equipment or rights to employ patented methods in combination with such equipment.

Yes, the important question of the sanitary engineer of today is "What about patents?" It was this question that prompted the Sanitary Engineering Division of the Am. Society of Civil Engineers to set up a Committee on Evaluation of Professional Objectives in the Design of Sanitary Engineering Works. In its first report the committee states that the requests underlying the formation of the committee appear to have arisen "mainly as the result of the growing practice of the use of patents, by promoters of processes or equipment, for controlling or limiting the selection of treatment processes for water and sewage." The report further calls attention to the fact that the existing situation has been causing "serious problems in obtaining designs that will provide sufficient competitive conditions to assure lowest costs" to the engineer's client—in most instances the public.

As recounted elsewhere in this issue the Professional Objectives Committee, through its chairman, Thomas R. Camp, rendered a second report which was read before the American Society of Civil Engineers in January. We regret our inability to print this expertly developed report in full. Copies pre-printed for distribution may be secured from the Society, but by the time this is in print it will most probably be available in the ASCE Proceedings for January, 1946. We would term this report—"A Primer on Patent Prudence." With its expertly phrased answers to the question—"What About Patents?"—it brought to Chairman Camp and his committee a special vote of thanks and appreciation following its presentation.

Revealing that some patents in which are tied together established processes with new equipment, or new features in combination with old processes, have been used in attempts to reduce competition, the committee points out that such unfair use of patents has served to antagonize public agencies and their engineers. On the other side the committee in one of its impressively forthright statements recommends to engineers that they recognize and honor all patents which embody reasonable claims until such time as there appears *unmistakable* evidence that such patents are not valid. On these two scores it appears essential that the sanitary engineer of today charged with the selection and design of treatment plants and processes will benefit greatly by having some training and experience in process development and operation, and it is also essential that he be more than heretofore familiar with patents and methods of patent protection.

Because of its carefully analytical exposition of "Patent Prudence" in the sanitary field we highly recommend the careful reading of this report by all purveyors of patented processes and equipment as well as those who are called upon to recommend and purchase such processes and equipment.

L. H. Enslow

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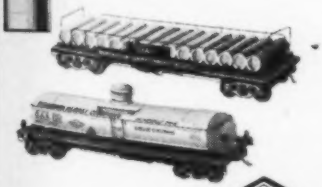

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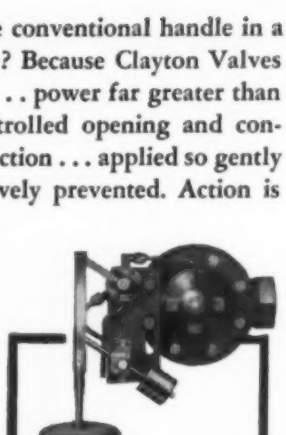

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Here and There with Doc Symons

It was a year ago in January that this column started off with some comment recommending the adoption of the metric system, the Centigrade temperature scale, and the 13 month calendar.

At the time I had no idea that in the ensuing 12 months (1) *Civil Engineering* would print a dozen or more letters on the metric system (most of them favorable), (2) that the New York Daily News would print four editorials recommending the adoption of the metric system, and (3) that at the N. J. Sect. AWWA Atlantic City meeting Martin Flentje's question box period would take up the question, "How would the metric system affect water works men?"

While most of the correspondence this column received on the subject was somewhat less than serious, at Atlanic City Charlie Capen reviewed the letters in *Civil Engineering*, and then Sam Newkirk of Elizabeth, N. J., requested yours truly to say "a few words." (Thanks, chum!) I had to admit that one of the difficulties would be in expressing a ⅝-in. meter in the metric system, but for the most part the objections raised to date have largely been emotional prejudices and not sound reasoning. As far as this column is concerned, the discussion is still open, and I haven't heard any argument against the Centigrade thermometer or the 13 month calendar.

* * *

While on the subject of the N. J. Sect. meeting, there is one thing you should know about that gathering in case you don't already—the turnout of the ladies of the section was little short of phenomenal. Maybe it was the famous Boardwalk or the shore dinners, but whatever it was, it certainly was pleasing to see so many lovelies on hand. And to Miss Ann

E. Body, Secretary to New Jersey's Secretary Cy Tygert—please reserve a double room for Doc and Mrs. Doc for next year.

* * *

If you don't believe there is some connection between water and sewage works men and music, just listen to this letter from Dr. Edward Bartow, who writes, "Dear Doc: From 1905 to 1916, nine of the Ill. State Water Survey Staff were outstanding musicians.

"Lewis I. Birdsall played the violin and viola in the University orchestra.

"Frank Bachman had been a cornetist before coming to the Survey but played the bass drum for three years in the Univ. band, was band manager in his senior year, and played the kettle drums in the University orchestra.

"Andrew Jacobson had played in the St. Olaf's College band and had been with them on the trip they took to the Scandinavian countries. W. F. Langelier played with the Mandolin and Guitar Club and was drum major in the band.

"F. W. Mohlman was a pianist, composer of a very popular student opera, organized the first student orchestra, and played saxophone in the Univ. band. Charles Spaulding played the piano and W. D. Hatfield graduated in piano two years before entering the Water Survey.

"C. C. Larsen played violin in the University orchestra. Robins Russell, who majored in water chemistry, played the violin, and A. A. Brensley also played in the Univ. band."

Wonder what happened to all of that musical talent at the Survey. In the seven years I was there, the only musician was Roy Graves.

* * *

Add Water Works Romances: George Norcom was a lieutenant on the laboratory staff of Col. Bartow at St. Nazaire during World War I, and the prettiest nurse in the hospital there was a girl named Anne. That's one war romance that paid off, for Mr. and Mrs. George Norcom make a handsome couple at a head table of a water works convention some 27 years later.

* * *

That "Stu" Coburn of Metcalf and Eddy said he didn't think much of the famed Waikiki Beach in Honolulu, but I notice he's back there

STRENGTH TO WIN!

The mighty B-29 Super Fortress has typified Uncle Sam's leadership in the air. This great plane not only did its bombing job well, it also proved itself highly resistant to enemy attacks . . . a winning combination.

• • •

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Baylis Sol — N Brand reacted with sulphuric acid. Used with any sterilization procedure. (U. S. Pat. No. 2,217,466)

°Patent Applied For

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again. Went out to work on the sewage disposal problem, but darn if he doesn't write back something about water supply.

* * *

In the Jan. '46 issue of Buckeye Sludge, "Barney" Barnes apologized to L. H. E. and G. E. S. for failure to send an announcement of the 1945 Ohio Conference. Then Barney added this: "Long may the team of Enslow and Symons wave (not weave) at our meetings." Say, what did he mean?

* * *

I read this somewhere—"The term *relief valve* should properly be used when the contents of a vessel are of liquid nature and the term *safety valve* should be used for contents such as steam or gas."

* * *

Did you know?

—That Mike Glace's son, Jack Glace, was married last Christmas week; is living at St. George Hotel in Brooklyn while stationed at the N. Y. office of the Seabees.

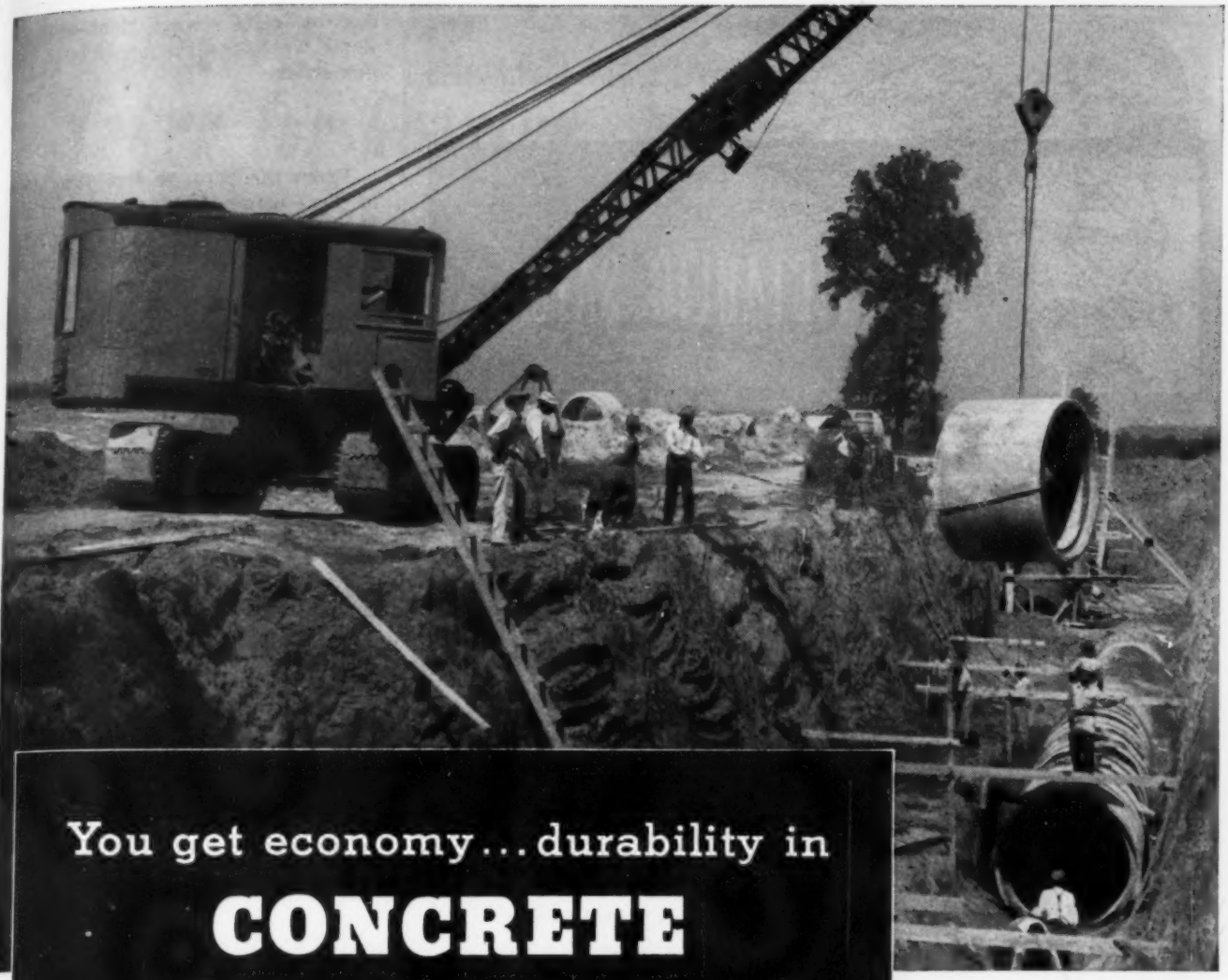
—That W. G. Bryant, of Griffin, Ga., was elected president of the Georgia Water and Sewage Assoc.—and other officers are: Comer Turley, Lindale, 1st V. P.; B. L. Coburn, Fitzgerald, 2nd V. P.; and that boy from Atlanta, Van P.(abst Beer) Enloe, secretary.

—That Prof., Maj., Dr. Rolf Eliassen, who once played the organ in Wellesley College (that's a girls' school, son), has a new home in Ridgewood, N. J., and a new baby (No. 2) to help fill it.

—That Ed Cleary has been made Executive Editor of *Engineering News Record.*

* * *

Imagine my surprise when I received a clipping from p. 2657 of the Nov. 28, 1945, issue of *Contractors Record and Municipal Engineering* (London, Eng.), said clipping being a letter from Arnold Kershaw, Sewage Works Manager, Borough of Slough, Sewage Purification Dept., Cippenham Lane, Slough Buck, commenting on my article, "Swat That Fly." Apparently the article was reprinted in England, for Mr. Kershaw wrote that whereas the electric fly trap ("The Sing Sing Fly Destroyer," he called it) was very effective on flies—there weren't any flies to



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destroy in his sewage plant—I didn't know we had a monopoly on *musca domestica.*

* * *

From the *Strange But True* dept. of *True* magazine, our editor clipped the following item:

"Not long ago in England, sixteen miles of coaxial cable were installed, three feet underground, between two radio stations. Shortly afterward, the engineers discovered that the cable was leaking, losing much of the nitrogen which is pumped through it to insulate the conductor from its protecting tube. Instead of digging it up to locate the holes, the men filled the cable with a gas that smelled like the odor of cats and then walked a dog over the route. The animal sniffed, dug furiously in fourteen spots, and 'pointed out' the fourteen leaks."

L. H. E. suggests we use this method to locate water main leaks and then destroy the odor by "a little activated carbon dust or superchlorination." Hmmm!

* * *

Some of you may know that I collect nicknames, and in fact have lectured on the subject. Well, I collected another one at the Baltimore meeting of the 4-States Section, and this new one was hung on me—you can bet that hereafter, that very, very lovely Grace Stuart is going to call me "Sonny" to remind me of my part in a feminine magician's act that had Casey Jones all tied up.

How I started the nickname collection is another story, but if you have any nickname stories, I'd certainly like to have them.

* * *

"Bridal" Paths (Cont.): Remember when Clint Bogert noted that Wendell La Due's article on forest preserves mentioned *Bridal* Paths. Wendell says the article was typed by a secretary who on that very day set her own wedding date, three weeks hence. "Small wonder," says Wendell, "she *was* thinking of bridal paths that day."

* * *

Honestly, I saw this title of an article in *Civil Engineering* and I give it to you to play with as you wish. What was the title? "Buckling of Members Accompanied by Creep." Now you add the punch-line.

Pure Water... Taken for Granted

Mom's apple pie may have been uppermost in the thoughts of our G. Is', in the foxholes during the war. High up on that list of wants, however, was a glass of palatable, pure, drinking water, the kind that just turning the faucet used to bring back home.

Watching the engineers take water from a dirty stream and convert it to water that was, if nothing else, at least "safe to drink," made many of these men realize how difficult it is for some people in this world to obtain the things we in the United States take for granted. Perhaps, too, they have a new conception of the importance of their water works officials and, incidentally, we hope, of chlorine.

But whether they do or not, you whose job it is to maintain, not only "water that is safe" but is also palatable, taste- and odor-free, know the value of high quality chlorine. And water works officials who have been securing their supplies of chlorine from Hooker have learned that they, too, can take for granted that every shipment will be of the same uniform high quality as the previous one.

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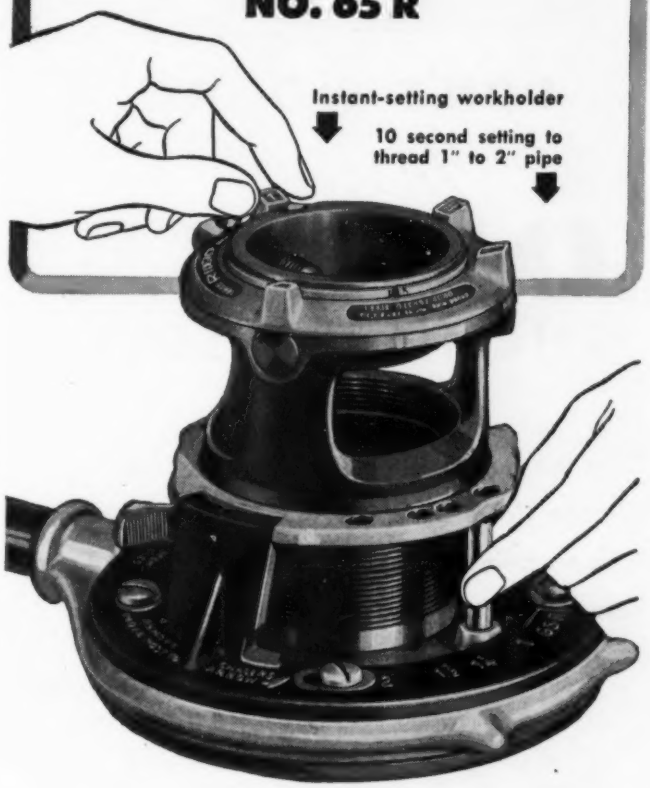

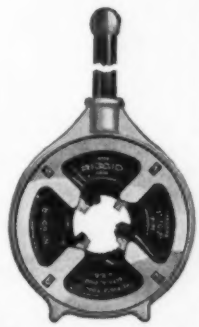

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MEETINGS SCHEDULED:

Mar. 14-15—MINNEAPOLIS, MINN. (Hotel Radisson)
Minnesota Section A.W.W.A. Sec'y-Treas., R. M. Finch, 416 Flour Exchange Building, Minneapolis, Minn.

Mar. 18-20—EAST LANSING, MICH.
Michigan Sewage Works Conference. Sec'y-Treas., R. J. Smith, Dept. of Health, State Office Bldg., Lansing, Mich.

Mar. 21-22—TRENTON, N. J. (Stacy-Trent Hotel)
New Jersey Sewage Works Association. Sec'y-Treas., S. A. Kowalchik, 427 Maple Ave., Trenton, N. J.
[NOTE: On Mar. 20th a pre-conference "Get-Together" will be held in the Stacy-Trent Hotel, beginning at 5 P.M.]

Mar. 21—BOSTON, MASS. (Hotel Statler)
New England Water Works Association. (Monthly Meeting). Sec'y, W. C. Conroy, 609 Statler Building, Boston, Mass.

Mar. 21—BOSTON, MASS. (Hotel Statler)
New England Section A.W.W.A. Sec'y, R. H. Ellis, 184 High St., Boston 10, Mass.

Mar. 28-29—ELMIRA, N. Y. (Mark Twain Hotel)
New York Section A.W.W.A. Sec'y-Treas., R. K. Blanchard, 50 West 50th Street, New York 20, N. Y.

Apr. 2-3—LAFAYETTE, IND. (Purdue Memorial Union Bldg.)
Indiana Section A.W.W.A. Sec'y, C. H. Bechert, 402 State Liberty Bldg., Indianapolis 9, Ind.

Apr. 8-10—NIAGARA FALLS, ONTARIO (General Brock Hotel)
Canadian Section A.W.W.A. Sec'y, A. E. Berry, Director, Ontario Dept of Health, Parliament Bldgs., Toronto 2, Ontario, Can.

Apr. 12-13—BUTTE, MONT. (Finlen Hotel)
Montana Section A.W.W.A. Sec'y, H. B. Foote, Director, Div. San. Eng., State Dept. of Health, Helena, Mont.

Apr. 15-17—FAYETTEVILLE, ARK. (Engineering Bldg.)
Arkansas Water and Sewage Conference. Sec'y, Harrison Hale, University of Arkansas, Fayetteville, Ark.

May 6-10—ST. LOUIS, MO. (Exhibits & Technical Meetings in Auditorium) (Accommodations in 12 Hotels)

American Water Works Conference. (Annual Meeting). Executive Secretary, Harry E. Jordan, 500 Fifth Ave., New York 18, N. Y.

May 17—GREENWICH, CONN. (Pickwick Arms)
New England Sewage Works Association. Sec'y-Treas., Walter E. Merrill, State Dept. of Health, 511A State House, Boston, Mass.

May 23-24—CORVALLIS, ORE. (Gearhart Hotel)
Pacific Northwest Section A.W.W.A. Sec'y, Fred Merryfield, Oregon State College, Corvallis, Ore.

June 13-14—LAFAYETTE, IND. (Purdue University)
Central States Sewage Works Assn. Sec'y-Treas., J. C. Mackin, Route 4, Madison, Wis.

June 20-21—AKRON, O. (Mayflower Hotel)
Ohio Conference on Sewage Treatment. Sec'y-Treas., L. B. Barnes, 441 So. Prospect St., Bowling Green, O.

Sept. 17-20—POLAND SPRING, ME. (Poland Spring House)
New England Water Works Assn. (Annual Meeting). Sec'y, W. C. Conroy, 609 Statler Bldg., Boston, Mass.

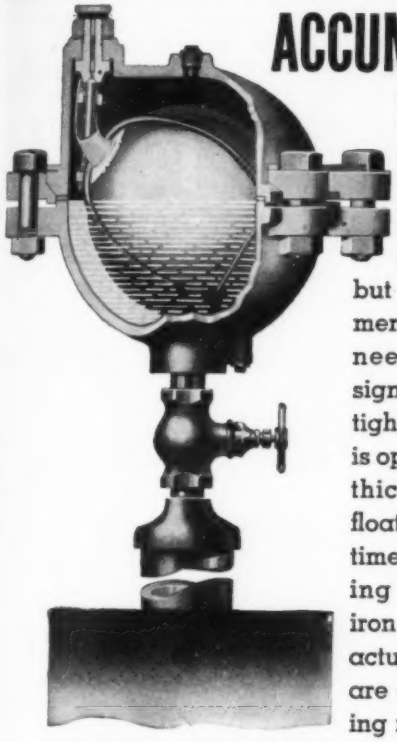
Oct. 7-9—TORONTO, CANADA (Royal York Hotel)
Federation of Sewage Works Assns. Exec.-Sec'y., W. H. Wisely, 625 Illinois Bldg., Champaign, Ill.

Oct. 9-11—COLUMBUS, O. (Hotels Fort Hayes & Chittenden)
Ohio Section A.W.W.A. Sec'y-Treas., F. P. Fischer, 811 Perry Payne Bldg., Cleveland, O.

IS *AIR SABOTAGING* YOUR PIPE LINES AND PUMPS?

If not removed, air entrained in a liquid or entering the system through leaky joints and pump suctions, may result in serious damage to the pipe line and to the pumping equipment. These air obstructions not only reduce the operating head, but the area of discharge is considerably reduced or entirely cut off.

SIMPLEX AIR RELEASE VALVES AUTOMATICALLY VENT AIR ACCUMULATIONS



THE Simplex Automatic Air Release Valve is of simple, dependable construction, having but one lever movement which operates a needle valve so designed as to be always tight seating. The valve is operated by a heavy thickness glass ball float, tested to several times the service working pressure. A cast iron shell houses the actuating parts which are of corrosion resisting materials.

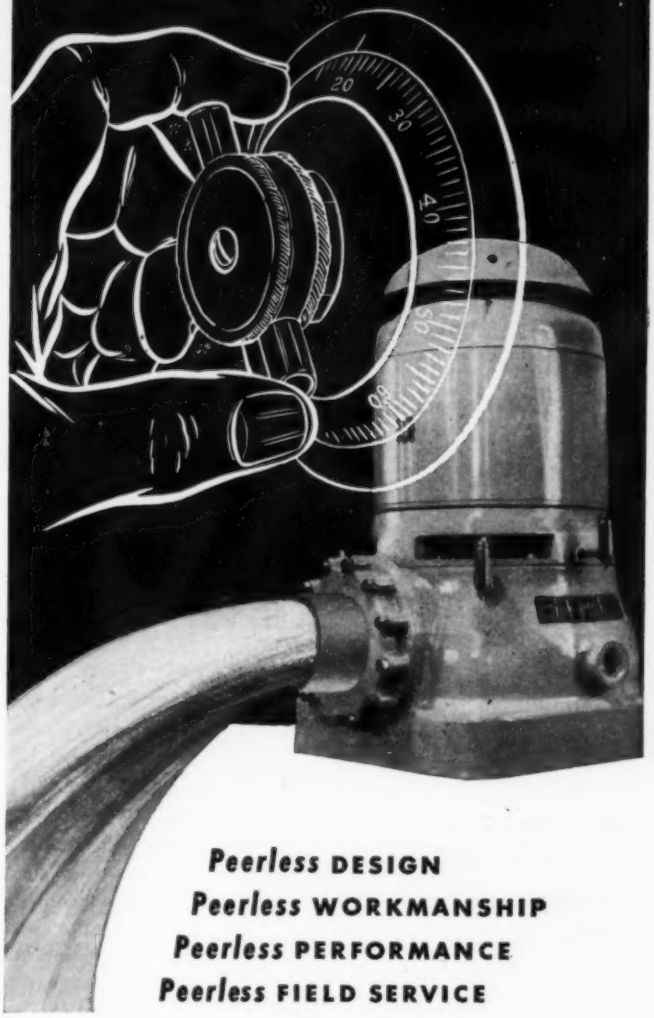
Standard Simplex Air Release Valve is for working pressures up to 250 lbs. per square inch. The Type "ARA" valve is similar in design but operates up to 1250 lbs. per square inch. Simplex Air Release Valves are being used extensively on lines and pumps for the release of air in water and sewage lines, oil and gasoline lines, and for industrial process liquids.

Write today for further information on the Simplex Air Release Valve — the automatic watchdog to assure continuous peak flow.

SIMPLEX VALVE & METER COMPANY

6743 Upland Street • Philadelphia, Pennsylvania

The Right Combination FOR L-O-N-G-E-R PUMP LIFE



***Peerless* DESIGN**
***Peerless* WORKMANSHIP**
***Peerless* PERFORMANCE**
***Peerless* FIELD SERVICE**

Behind the Peerless combination is safe pumping—the kind of operation that eliminates pump worries for years to come. Peerless Deep Well Turbine Pumps are foremost on the water front because of their traditionally better performance and greater dependability. Capacities: 15 to 30,000 gallons per minute.

Peerless also manufactures a complete line of Domestic Water Systems, and Horizontal Centrifugal Pumps (formerly Dayton-Dowd).

Get in touch with the nearest Peerless distributor right now if you need a new pump during 1946. He has interesting news for you.

PEERLESS PUMPS

PEERLESS PUMP DIVISION
Food Machinery Corp.

FACTORIES
LOS ANGELES 31, CALIFORNIA
301 West Avenue Twenty-six
QUINCY, ILL. • CANTON 6, OHIO

Perth Amboy, N. J.
Proves the Stamina of Rugged 8,500 Lb.

MORRIS PUMP

The acceptance test of this Morris Centrifugal Pump showed a delivery of 6,700 GPM at the specified head — an efficiency of 89%, as against the guaranteed 86% efficiency. That was 9 years ago. Since then it has been pumping around 9,000,000 gallons per day, from the Runyon Pumping Station to Perth Amboy, 9 miles away. No major replacements or repairs have been needed during all that time.

THAT shows the value of the Morris policy of building heavy, rugged pumps with conservatively rated bearings and shafts. This particular pump weighs 8,500 pounds. It is direct connected to a 400 HP, 1200 RPM synchronous motor, producing top efficiency at that moderate speed. The suction opening is 16", the discharge opening 14". And it is a *standard* Morris bronze fitted, horizontally split, double suction, single stage pump. Nothing unusual about it except its high, maintained efficiency and long life.

Engineered for the Job

Every Morris Pump is engineered to give the best all-around performance under the conditions at hand. Pumps for municipal water works are built especially for uninterrupted service and long wear . . . and to operate efficiently and economically for long periods, thereby reducing costs in the long run. Morris engineers do not believe in any theoretical 10-year limit to the life of a clear-water pump. Morris Pumps have proved time and again that they can be operated economically and efficiently for many years after this theoretical limit.

Ask for specifications and operation data on pumps to fit your particular needs — based on more than 75 years of Morris pump-building experience.

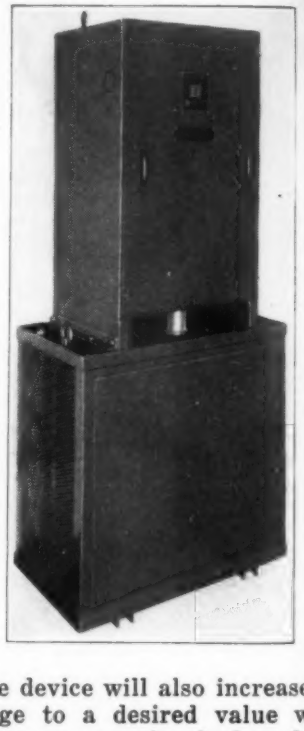
MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Branch Offices in Principal Cities

MORRIS
CENTRIFUGAL PUMPS

MANUFACTURERS' and EQUIPMENT NEWS

New Power Factor Regulator

The Haug System Power Factor Regulator has been announced by the Modern Control Equipment Co. of Chicago. When connected to lines of commercial power users, this regulator is set to raise the power factor by taking the magnetizing current off the line with a negligible cost in operation. By increasing the power factor, the monthly power bill will be decreased.



The device will also increase low voltage to a desired value where voltage was previously low due to a poor power factor. There are no moving parts in the regulator. The reactors and transformers are of a dry type construction, and the regulator may be installed in almost any desired location inasmuch as it is small in size. It requires no discharge coils or other safety devices.

A bulletin on the Haug System Power Factor Regulator may be obtained from Modern Control Equipment Co., 176 W. Adams St., Chicago 3, Ill.

Purser and London, Inc.

Successor to J. R. Purser Sales Engineer, Inc.

Announcement has been received of the formation of a new corporation, Purser and London, Inc., at 816 Independence Building, Charlotte 2, N. C., as successors to the J. R. Purser Sales Engineer, Inc. The new company will continue, as in the past, with the sale of hydraulic, mechanical and electrical equipment for municipalities, industries, contractors, and utilities in North and South Carolina. The company represents Builders-Providence, De Laval Separator Co., De Laval Steam Turbine, Omega Machine Co., %Proportioneers%, Ross Heater & Mfg. Co., and Yeomans Brothers Co.

J. R. Purser, Jr.
President

J. B. London
Vice-Pres.

John R. Purser, Jr., president, has been with the firm, established in 1910 by his father, since 1927. Since 1939 Mr. Purser was head of the firm. He is a past chairman of the N. C. Section of the American Water Works Association.

John B. London, vice pres. and treas., was formerly associated with the Charlotte office of the General Electric Company as an apparatus sales engineer. During the war, Mr. London served as a Lt. Commander in the U. S. Naval Reserve as a Catapult Project Engineer at the Naval Aircraft Factory in Philadelphia.

W. H. Stewart Back in Syracuse

W. H. "Bill" Stewart, the man with the well known Stewart Sewer Rods is back in Syracuse again after four years' service with the United States Navy. Bill Stewart, a graduate of Annapolis, was recalled to active duty at the beginning of the war and served during the war as the Commanding Officer of the Naval Pre-Flight School at Iowa City, Iowa.

R-C dual-ability

means better blower performance

R-C Centrifugal Blowers may be driven by steam turbine or direct connected motor—whichever is best fitted to the installation.

CENTRIFUGAL

R-C Centrifugal Blowers are available in a multitude of sizes of single or multi-stage design, in capacities up to whatever your needs may be.

ROTARY POSITIVE

Where the rotary positive displacement type is better adapted to your needs, no other company can meet the standards set up by R-C equipment . . . the leader in the field for almost a century.

You'll get profitable service from Roots-Connersville Centrifugal Blowers and Exhausters because:

1. Our engineers study your needs in detail before selecting type, speed, drive, number of stages, style of impellers, etc., to insure the unit best adapted to your special requirements.

2. Our plant builds the units with scrupulous care, to close tolerances, with fine machining and finish of the materials best fitted for the work. They check every part, and the final assembly is subjected to rigid tests, before shipment.

Proof of the practical value of this R-C *dual-ability* is found in the many installations of our Centrifugal Blowers and Exhausters. They're being successfully and profitably used in almost every industry. They live up to their guarantees and have unfailingly given excellent performance.

For better blower performance, you can depend on us.

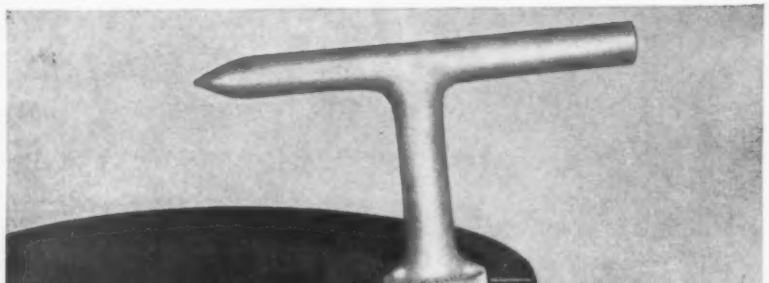
ROOTS-CONNERSVILLE BLOWER CORP.
One of the Dresser Industries
602 Mount Avenue, Connersville, Indiana

Roots CONNERSVILLE SINCE 1854

CENTRIFUGAL BLOWERS & EXHAUSTERS

ROTARY POSITIVE AND CENTRIFUGAL BLOWERS • EXHAUSTERS • BOOSTERS
LIQUID AND VACUUM PUMPS • METERS • INERT GAS GENERATORS

The *Key* to all Good METER BOX COVERS



The Ford Lifter Worm Lock is first of all a strong, secure lock to hold the lid tightly on the meter box, preventing accidents to pedestrians and damage to the meter.

The FORD WORM LOCK

When the meter reader places his key on the forged Everdur bolt and turns it the lid is forced upward by a powerful screw-jack action which breaks any seal of ice or dirt. *Then* with the lid unlocked the key is automatically attached to the bolt and serves as a handle for lifting. The action of locking automatically disengages the key. The meter reader doesn't need to touch the lid. For over 35 years the Ford Lifter Worm Lock has been proved and improved.

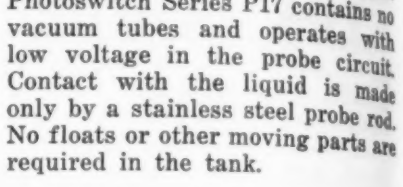
The Lifter Worm Lock is standard and exclusive on all Ford Meter Box Covers. Here are four of the 12 sizes of Type C Single Lid Covers.

SEND FOR OUR CATALOG

The
FORD METER BOX COMPANY, INC.,
WABASH, INDIANA

Photoswitch Level Control

Designed for use in the dairy and food processing industries, the Photoswitch Sanitary Level Control Series P17 (a series of rugged electronic relays for level control of all liquids) may find application in water and sewage works equipment. Photoswitch Series P17 contains no vacuum tubes and operates with low voltage in the probe circuit. Contact with the liquid is made only by a stainless steel probe rod. No floats or other moving parts are required in the tank.



When the level of the liquid in the tank falls below the lower probe, the level control closes the circuit controlling the pump and the tank fills. When the liquid rises to the level of the upper probe, the circuit controlling the pump opens and the pumping operation stops. For pumping-out control, the operations are reversed.

Further information on this new device may be had from Bulletin No. 200-P, which may be obtained from Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass.

Le Roi Appoints New Officers

John M. Dolan, Vice Pres. in Charge of Sales; Cecil W. Brown, General Sales Manager

The Le Roi Company of Milwaukee, Wis., manufacturers of combustion engines, air compressors, generator sets, etc., has announced the appointment of John M. Dolan as Vice President in Charge of Sales. Mr. Cecil W. Brown has been named as General Sales Manager, succeeding to the position formerly held by Mr. Dolan. Arthur A. Ladwig has been appointed Vice President in Charge of Manufacturing.

Mr. Dolan, a graduate of the School of Engineering of Northwestern University, was associated with the Dryden Rubber Co., and the Sullivan Machinery Co. before joining Le Roi in 1943. Mr. Brown has been associated with Le Roi Co. since 1938. Mr. Ladwig has been

with the company since 1923, having become General Superintendent in 1938 and Works Manager in 1942

Westinghouse Elects Price President

The Westinghouse Electric Corp. has announced the election of Gwilym A. Price as president, succeeding George H. Bucher, who has resigned from that office to become vice chairman of the Board.

Mr. Bucher was elected vice chairman of the Board of Directors and will continue to serve as chairman of the Westinghouse Electric International Co.

At the age of 50, Mr. Price is one of the country's youngest directing heads of a major corporation. A graduate of the University of Pittsburgh Law School in 1917, Mr. Price is a veteran of World War I, and has been associated with the Pittsburgh Trust Co. for many years before joining the Westinghouse Corporation in 1943.

As president of Westinghouse, Mr. Price becomes the chief executive officer of the Corporation.

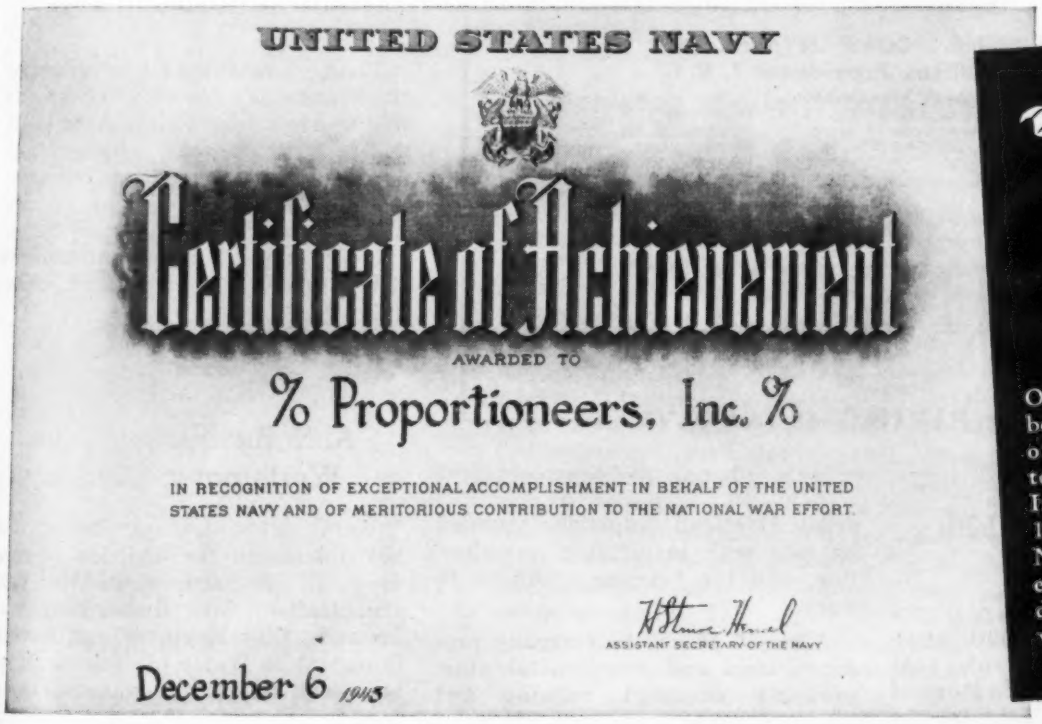
Portable Electric Generating Plant

Pictured herewith is an Onan Electric Generating Plant, which drives an electric motor of a Toledo Universal Power Drive and Adjustment Device, which in turn opens or closes valves on the water works distribution system of the Minneapolis Water Dep't. The Model WCT-3 is a 3000-watt unit mounted in a compartment of the maintenance truck where it is easily accessible, for servicing and inspection. Powered by a two-cylinder water cooled Onan engine, it can be taken directly to any location wherever emergency repair is required. These portable generating plants are manufactured by D. W. Onan & Sons, 43-51 Royalston Ave., Minneapolis, Minn.

Fleisher's Methyl Purple Indicator

The Fleisher Chemical Co. of Washington, D. C., have developed and are now marketing a new indicator (Methyl-Purple Indicator) for alkalinity titrations in water analysis. The new indicator designed to replace and overcome the disadvantages of methyl orange is green in alkaline solution and purple in acid solution. The indicator changes from green to pH 5.4 to gray at pH 5.1 and to purple at pH 4.8.

The indicator is obtainable in pint and quart plastic closure bottles from the Fleisher Chemical Co., Benjamin Franklin Sta., Washington 4, D. C.

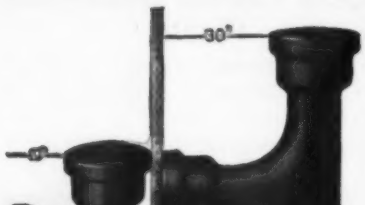

UNITED STATES NAVY
Certificate of Achievement
AWARDED TO
% Proportioneers, Inc. %
IN RECOGNITION OF EXCEPTIONAL ACCOMPLISHMENT IN BEHALF OF THE UNITED STATES NAVY AND OF MERITORIOUS CONTRIBUTION TO THE NATIONAL WAR EFFORT.
ASSISTANT SECRETARY OF THE NAVY
December 6 1945

Our many friends will be interested to learn of the award made to % Proportioneers, Inc.% December 6th, 1945 by the U. S. Navy for whom our efforts were largely devoted during the war.

Design and production of water purification equipment for our fighting Navy was both a duty and honor which we did our best to fulfill. The experience thus gained has now been turned to peacetime manufacture and enables us to serve you far better than we could four years ago. New models, materials and methods developed during the war — proven by the most severe operating conditions — are now ready for your use. For information on this improved water treating equipment, write to % Proportioneers, Inc.%, 9N Codding St., Providence 1, R. I.

SAME USE...

But What a Difference In Size and Weight



Grinnell Competition

	Grinnell		Competition	
	Weight	Run from bell to bell	Weight	Run from bell to bell
4"	96 lbs.	11 in.	128 lbs.	22 in.
6"	147 lbs.	13½ in.	200 lbs.	24 in.
8"	222 lbs.	16 in.	294 lbs.	26 in.
10"	325 lbs.	19 in.	395 lbs.	28 in.
12"	417 lbs.	21½ in.	512 lbs.	30 in.

Choose **Grinnell Socket Fittings**

The compact design of Grinnell Socket Fittings does make a lot of difference in actual use—and you'll like that difference! They are easier to handle, fit neatly into close quarters, and speed installations. Friction loss is actually reduced.

Socket and spigot dimensions and wall thickness are the same as AWWA standard Class D pipe. Approved by Underwriters' Laboratories.

Bends are provided with lugs to take socket clamps. Special coating of coal tar pitch varnish.

Write for catalog: "Water Works Specialties."

GRINNELL COMPANY, INC.
Executive Offices, Providence 1, R. I.

Branch Warehouses

Atlanta 2, Ga.
Charlotte 1, N. C.
Chicago 9, Ill.
Cleveland 14, O.
Houston 1, Tex.
Los Angeles 13, Cal.
Minneapolis 15, Minn.
New York 17, N. Y.
Oakland 7, Cal.
Philadelphia 34, Pa.
Providence 1, R. I.
St. Louis 10, Mo.
St. Paul, Minn.
San Francisco 7, Cal.
Seattle 1, Wash.

GRINNELL

FOUNDED 1850

WHENEVER PIPING IS INVOLVED

Nooter Celebrates 50th Anniversary

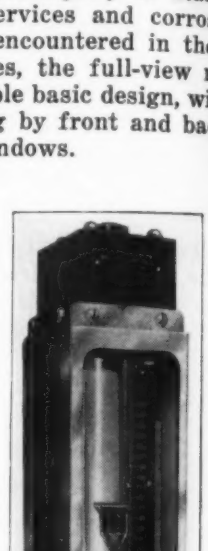
The John Nooter Boiler Works Company celebrates the 50th anniversary of its founding this year in St. Louis. The complete story of the anniversary is given in the Fiftieth Anniversary Number of Nooter's *Boilermaker.*

Founded in 1886 by John Nooter, the company has gone through the usual vicissitudes of business cycles that have befallen many typically great American industries founded by men with inspiration, imagination, and the fearless ambition to work.

After 50 years, the company produces steel and drum metal alloy products, chemical, refining and brewery equipment, pressure vessels, transformer tanks, heat exchangers, condensers, coolers, as well as continuing to carry on the field of stack and tank erection, boiler rebuilding, and code welded repairs.

Brooks Rotameter

The Brooks Rotameter Co. of Lansdale, Pa., has announced a new full-view rotameter with "Safety-shielding" for accurate flow rate measurement and control. Designed principally to stand up in tough services and corrosive conditions encountered in the process industries, the full-view rotameter is a simple basic design, with safety shielding by front and back safety glass windows.



The new rotameter has a number of advantages over other styles and will be available in sizes from ⅛-in. to 4-in. with screwed or flanged connections, and it is made in iron, brass, or stainless steel as desired. The full-view rotameter may be obtained from the Brooks Rotameter Company, P. O. Box B-1228, Lansdale, Pa.

A. K. Richardson Joins Worthington-Gamon

Worthington-Gamon Meter Co. has announced the addition of Andrew K. Richardson to its field organization. Mr. Richardson was formerly City Engineer and Superintendent of Water of Helena, Montana, and has just completed three years' service with the Navy, holding the rank of Lieutenant. Mr. Richardson will be located in Chicago and will handle the company's line of liquid meters in the Chicago area including northern Illinois, Indiana, and the state of Wisconsin.

Joe Gilbert Heads Link-Belt Sanitary Engineering Sales

Lt. Col. Joe J. Gilbert, recently released from wartime service with the U. S. Army Sanitary Corps as assistant director of the Sanitary Engineering Division of the Surgeon General's Office in Washington, D. C., assumed the position of Sales Engineer, Sanitary Engineering Division of Link-Belt Company. This is the position vacated by M. B. Tark on his retirement in 1944. Mr. Gilbert, a graduate of the Towne Scientific School of the University of Pennsylvania with a degree in Civil Engineering, will have his headquarters at the company's Philadelphia plant.

J. J. Gilbert

Discharge Check Valve

The J. A. Zurn Manufacturing Co. of Erie, Pa., has designed a discharge check valve to give positive protection against the backsurge of discharge lines carrying steam, sludge, waste water, and other waste liquids in gravity flow installations.

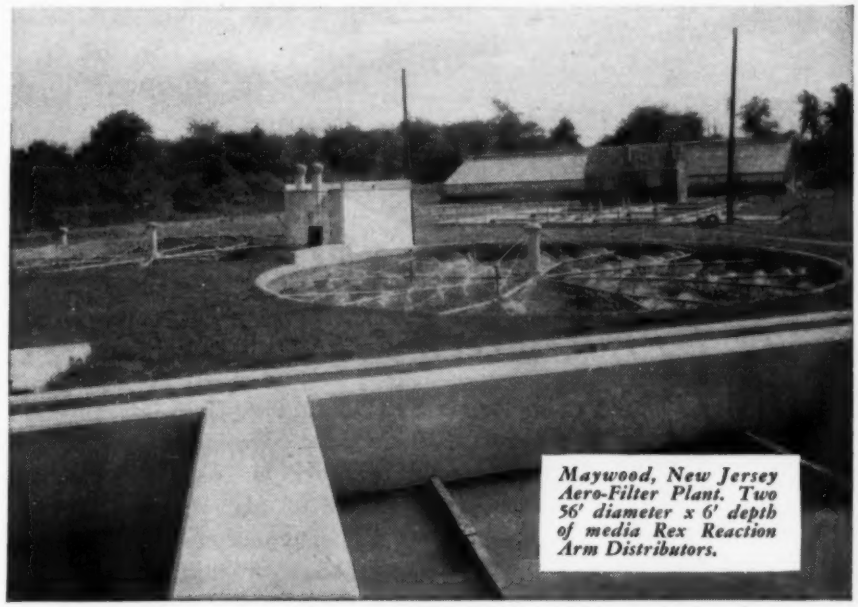
The design of the check valve is shown in the accompanying photograph. These valves may be operated with or without manual control, or with an extension shaft or flexible cable from an access box. Flanges are 150 lb. flat faced and blank or drilled as specified. They are available with 180 deg., 105 deg., or 90 deg. bodies made of cast bronze, steel, semi-steel, cast iron and alloyed metals for corrosion resistance.

Graver Tank Announces New Appointments

Sharp Gen'l Mgr. and Shipman Plant Supt.

The Graver Tank and Manufacturing Co., Inc., of East Chicago, Ind., has announced the appointment of H. G. Sharp to the position of General Manager, and also the appointment of William G. Shipman as Plant Superintendent.

Mr. Sharp is a veteran of 27 years' production experience in this country and Europe, and goes to Graver from the General Machinery Ordnance Corp., where he was Assistant General Manager. Mr. Sharp is a native of Buffalo and attended the Sheffield Scientific School of Yale University. Mr. Shipman is a graduate of Cornell



Maywood, New Jersey Aero-Filter Plant. Two 56' diameter x 6' depth of media Rex Reaction Arm Distributors.

Greater daily capacities in less space with REX AERO-FILTER!

Combining maximum daily capacity with small filter bed size, the Rex Aero-Filter offers a proved economical method of treating sewage and trade wastes.

Because a continuous, low momentary rate of application can be maintained . . . dispersed in a rain-like spray over every square foot of filter bed surface 24 hours a day . . . the Aero-Filter permits the use of smaller beds. It eliminates the need for excessive recirculation and oversize primary settling tanks. Installation, maintenance and power costs are considerably reduced.

In general, the Aero-Filter has a maximum working capacity of 26 million gallons per acre per day . . . almost 9 times the capacity of the conventional filter. Loadings of 3000 pounds of BOD per acre foot per day and daily average dosing rates of 18 MGAD are standard. In some applications (as roughing filters), 12,000 pounds of BOD per acre foot per day are not unusual.

Two types of Rex Aero-Filters in a wide selection of flow arrangements are available . . . Motorized Disc Type and Reaction Arm type. For complete information on Aero-Filters and other types of efficient Rex Sanitation equipment, write Chain Belt Company, 1610 West Bruce Street, Milwaukee 4, Wisconsin.

REX SANITATION EQUIPMENT
CHAIN BELT COMPANY OF MILWAUKEE
Member of the Water and Sewage Works Manufacturers Association, Inc.

Bar Screens • Triturators • Conveyor and Tow-Bro Sludge Removers • Rapid and Slo-Mixers • Aero-Filter Distributors • Grit Collectors and Washers

THE HILL-HUBBELL TRADE MARK

The HILL-HUBBELL Process Prolongs STEEL PIPE Life
A product of GENERAL PAINT CORPORATION

APPLIED

FACTORY

assures your
Pipe Protection Investment

PIPE →
PRIMER →
1st HOT COAT →
2nd HOT COAT →
FELT WRAPPER →
80 lb. KRAFT PAPER →

The HILL-HUBBELL PROCESS imprinted on the paper wrapper covering our FACTORY processed Steel Pipe, assures SKILLED WORKMANSHIP—it also means that only after rigid inspection, the 80 lb. KRAFT paper is applied to a highly satisfactory pipe protection job.

From ¾" to 30" O.D. pipe sizes is a broad range of applications; HILL-HUBBELL is equipped with modern machinery to process any standard pipe size within this range.

GENERAL PAINT CORPORATION
HILL, HUBBELL & CO. • Division • Cleveland, Ohio
• EXPORT OFFICE: SAN FRANCISCO, CALIFORNIA, U. S. A. •

with a degree in mechanical engineering, and has had experience in plant supervisory work with Babcock and Wilcox, Allied Chemical Corp., Firestone Tire and Rubber Corp., and General Motors.

Rockwell Mfg. Co. News

Since the recent announcement of the adoption of the name Rockwell Mfg. Co. for Pittsburgh Equitable Meter Co. and its associated companies, additional news has been forthcoming.

The Rockwell International Corp., located in the Empire State Bldg. in New York City, has been organized to coordinate the export activities of all of the associated companies in the Rockwell Mfg. Co. including Pittsburgh Equitable Meter, Nordstrom Valve Co., etc. The Rockwell International Corp. is under the direction of A. L. DiGuillian.

The Edward Valve & Mfg. Co., Inc., of East Chicago, Ind., a subsidiary of Rockwell Mfg. Co., has shortened its name to Edwards Valves, Inc., and the Rockwell Mfg. Co. has recently acquired the Arcade Mfg. Co., Freeport, Ill., manufacturers of foundry equipment, hardware, etc.

Finn Worthington's Export Manager

W. A. Finn, having just been released from the U. S. Navy, has been appointed Export Manager of Worthington Pump & Machinery Corp. Mr. Finn succeeds George Gellhorn, who has accepted the position of General Manager of the C. E. Halaby Co., one of Worthington's industrial machinery dealers in Columbia, S. A. Formerly of the Boston office of the company before the war, Mr. Finn's new headquarters will be in Harrison, N. J.

Cam-Stat Temperature Control

A new line of adjustable calibrated Cam-Stat temperature control has been announced by the Paul Henry Co., Los Angeles. Among the outstanding advantages

claimed are a precise dial selection of temperature control point, with uniformity of dial accuracy in all units; virtually no increase in space required for mounting; no increase in cost over other thermostats without calibrating dial; tamperproof dial installation preventing changing of adjustable range provided at the factory; and lastly a ready adaptability to specially styled adjusting knobs and other design requirements.

The model shown has an adjustable range applicable to the control of water heaters. A choice of adjustable ranges is also available

between minus 50 degrees and plus 600 degrees F., with differentials as low as 1 degree. A variety of mounting is available for adapting the unit to the control of air, gas, liquid, or solids.

The Paul Henry Co. is located at 2037 South La Cienga, Los Angeles 34, California.

Servicemen Return to Neptune

Recent news releases from the Neptune Meter Co. have announced the return of two former employees, and the employment of a third, all of whom saw active service during the war.

W. Creighton Brown Herbert B. Brown Louie M. Preedom

Herbert B. Brown returns to the Chicago branch as sales engineer from active duty as a Captain with the 23rd Destroyer Group No. 9. W. Creighton Brown, Jr. rejoins the company's sales staff in the territory of Missouri with headquarters at the Kansas City Office, after 20 months overseas with the 8th Field Artillery.

Louie M. Preedom has joined the company in the capacity of sales engineer with headquarters at Dallas, Texas. Mr. Preedom served as a Major in the U. S. Army Heavy Artillery for five years, five months of which was in overseas combat.

Platt to Represent Columbia Chemicals in Boston

The Columbia Chemical Division of Pittsburgh Plate Glass Co. has announced the appointment of William L. Platt as sales representative at the company's offices, 300 Babcock St., Boston. Mr. Platt is a graduate of Purdue in Chemical Engineering, and has been associated with the company's Glass Division for the past 16 years, specializing in industrial engineering and in various phases of production of heavy chemicals.

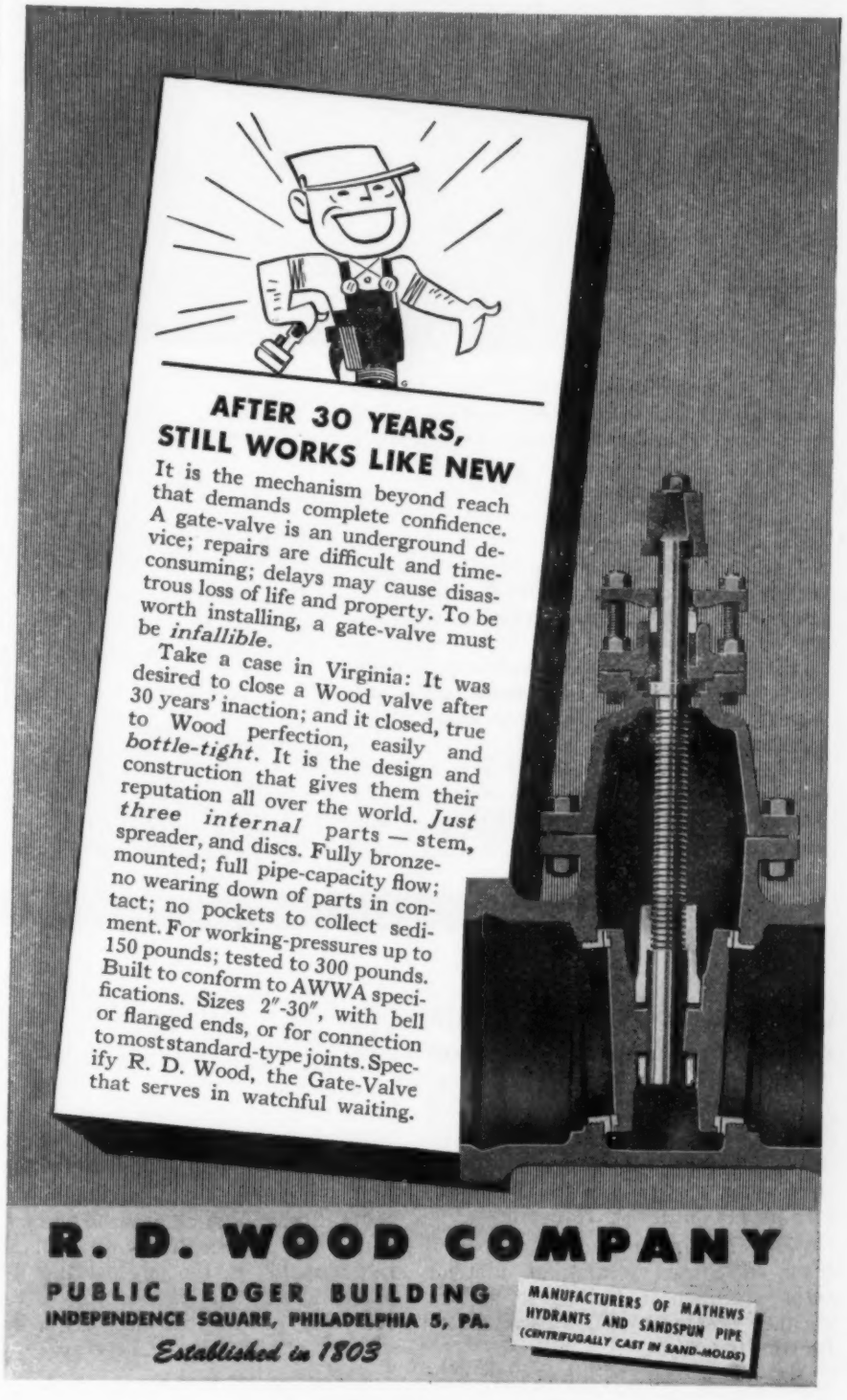
25th Anniversary for Two at W&T

Kinney and Davis Honored

At a dinner sponsored by the W&T Diamond Club composed of employees who have ten years or more of service with the Wallace and Tiernan Industries, Messrs. James B. Kinney and Harold F. Davis were honored on the completion of 25 years with the company.

Jim Kinney, a graduate of Syracuse University in 1919 as a Civil Engineer, joined Wallace & Tiernan on July 25, 1920, as a field engineer in the Newark office. Subsequently he was appointed District Manager of Eastern Pennsylvania, and in 1932 assumed management of the Canadian organization, where he has been since.

Harold Davis, a graduate of Roanoke College (Va.) with a Master's Degree in 1914, joined the company in August of 1920 as a District Engineer in Newark. In 1926 he assumed management of the Charlotte office in which capacity he has charge of all activity in the Carolinas.


AFTER 30 YEARS, STILL WORKS LIKE NEW
It is the mechanism beyond reach that demands complete confidence. A gate-valve is an underground device; repairs are difficult and time-consuming; delays may cause disastrous loss of life and property. To be worth installing, a gate-valve must be infallible.
Take a case in Virginia: It was desired to close a Wood valve after 30 years' inaction; and it closed, true to Wood perfection, easily and bottle-tight. It is the design and construction that gives them their reputation all over the world. Just three internal parts — stem, spreader, and discs. Fully bronze-mounted; full pipe-capacity flow; no wearing down of parts in contact; no pockets to collect sediment. For working-pressures up to 150 pounds; tested to 300 pounds. Built to conform to AWWA specifications. Sizes 2″-30″, with bell or flanged ends, or for connection to most standard-type joints. Specify R. D. Wood, the Gate-Valve that serves in watchful waiting.
R. D. WOOD COMPANY
PUBLIC LEDGER BUILDING
INDEPENDENCE SQUARE, PHILADELPHIA 5, PA.
Established in 1803
MANUFACTURERS OF MATHEWS HYDRANTS AND SANDSPUN PIPE (CENTRIFUGALLY CAST IN SAND-MOLDS)

Norwood Filters as installed at American Brass Co., Ansonia, Conn.

From Maine to Montana users are enthusiastic about Norwood Gravity Filters for municipal or industrial water purification service.

These efficient filters will remove pollution and foreign matter as well as practically all of the suspended material in the water. They may be combined with aeration and automatic chemical treatment to remove odors, color and objectionable chemical content.

Fifty years of specialized experience back every Norwood filter installation, yet latest engineering features make them modern as tomorrow.

Municipal or industrial officials, consulting or waterworks engineers are invited to ask our help on any water filtration problem, now or postwar.

W-1

The NORWOOD
ENGINEERING COMPANY
25 N. Maple St.
Florence, Mass.

The Best For Your Money
NORWOOD FILTERS
In The Long Run

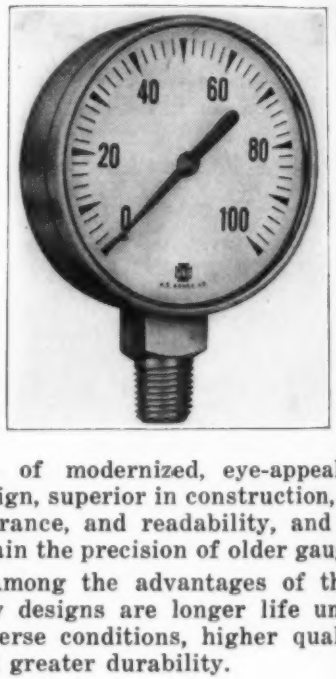
Homelite Reopens Chicago Office

The Homelite Corporation of Port Chester, N. Y., has announced the reopening of an office to service the Chicago area. The new office, located at 2409 Lake St., Melrose Park, Illinois, will be managed by T. W. Gramm, formerly manager of Homelite's Philadelphia office.

The new office has shop facilities for complete servicing and repairing of Homelite units. Factory trained mechanics and a complete stock of service parts will be available to provide speedy service in the interest of Homelite equipment owners.

New U. S. Gauges

The United States Gauge Division of American Machine and Metals, Inc., has announced the introduction of a complete new line of streamlined gauges. These gauges



are of modernized, eye-appealing design, superior in construction, appearance, and readability, and yet retain the precision of older gauges.

Among the advantages of these new designs are longer life under adverse conditions, higher quality, and greater durability.

Link-Belt Texas Mgrs. Sears at Houston, Penick at Dallas

Link-Belt Co. has announced that Joseph W. Sears, heretofore district sales engineer at the Link-Belt plant in Dallas, has been appointed district sales manager with headquarters at 711 Main St. Houston.

Also announced was the appointment of Stuart Penick as district sales engineer at Dallas, to fill the vacancy created by Mr. Sears' transfer to Houston.

Mr. Sears received his engineering education at Armour Institute of Technology (now I.I.T.), Chicago Technical College, and Austin Evening School, Chicago. He entered the service of Link-Belt Company in 1935, starting in the engineering department of the Pershing Road plant, Chicago.

Mr. Stuart Penick entered the employ of the Link-Belt Ewart plant, Indianapolis, in the engineering department in 1935, immediately after receiving his B.S. in mechanical engineering at the University of Texas.

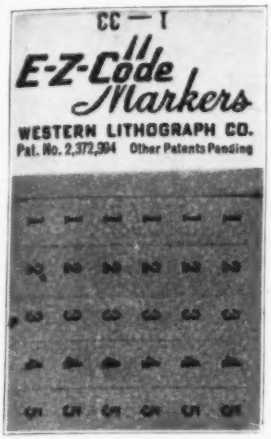
New Hooker Assignments

The Hooker Electrochemical Co. of Niagara Falls, N. Y., has recently assigned two new members to the sales staff. Lloyd S. Bovier, formerly sales representative of the central states, has been assigned to the Sales Development Department with headquarters at Niagara Falls, where he will devote himself to field work in the application of new Hooker chemicals. At the same time, Mr. Charles

Daving has been assigned as a salesman with headquarters in Cincinnati, Ohio. He has spent a number of years in plant work at Niagara Falls prior to his recent appointment.

E-Z Code Markers

What with water and sewage works becoming more and more electrical, and complex electrical controls becoming more and more prevalent, it is often found helpful to mark the wires in conduits.



Whether you have complex wiring circuits or a simple installation, the E-Z Code Markers, made by the Western Lithograph Co., will not only speed the initial installation but will greatly simplify the problem of rewiring and change.

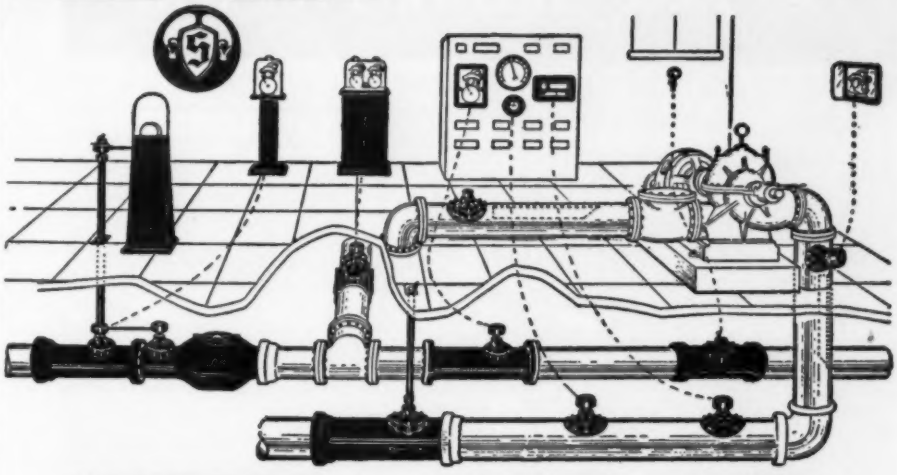
For a sewage plant or a water plant that has 30 miles of wiring (and we know one that does), these markers should find wide interest. E-Z Code Markers are made of flexible, durable, waterproof material and are ready for use, as they require no moistening.

These code markers are available in standard code numbers or tailor-made with special symbols and/or color for your specific requirements. Write the Western Lithograph Co., 600 E. Second St., Los Angeles 54, Calif.

Barrows' Industrial Equipment Co. to Represent De Laval

The De Laval Steam Turbine Co. of Trenton, N. J., has announced the appointment of H. H. Barrows and his organization, the Industrial Equipment Co., as sales representatives throughout lower Michigan peninsula for the IMO Pump and Worm Gear Divisions of De Laval.

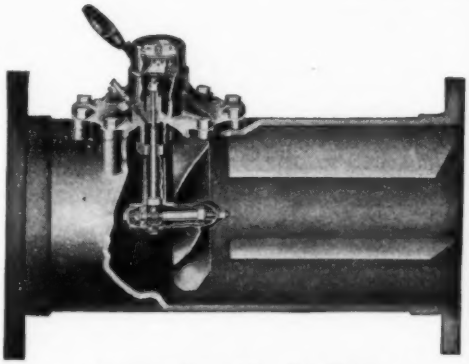
SPARLING



METERS for MAIN-LINES

TOTALIZATION—Every Sparling Meter is a complete Totalizing unit. Easily installed as shown—in a tube section or saddle-mounted on the line.

INDICATION—On the wall, right, is shown a Totalizer-Indicator. Also a "Town Clock" Indicator is mounted in panel.



Cutaway view of Sparling Meter. Note Direct Action from Propeller to Totalizer

RECORDING—Four of the types of Sparling Indicator-Totalizer-Recorders are shown—pedestal type; forward and reverse flows type; panel mounted; and 60-day straight-line strip-chart.

CONTROLS—Auto - metered controls, both mechanical and electrical. Note Bell & Spigot Compound Meter with solid extension to Chlorinator.

For details and prices see Bulletin 308, sent upon request.

SPARLING *Manufacturer of Water Measuring Equipment*

LOS ANGELES 54..Box 3277 Terminal Annex
CHICAGO 16.....3104 South Michigan Ave.
BOSTON 8.....6 Beacon Street
622 Broadway.....CINCINNATI 2
101 Park Avenue.....NEW YORK 17

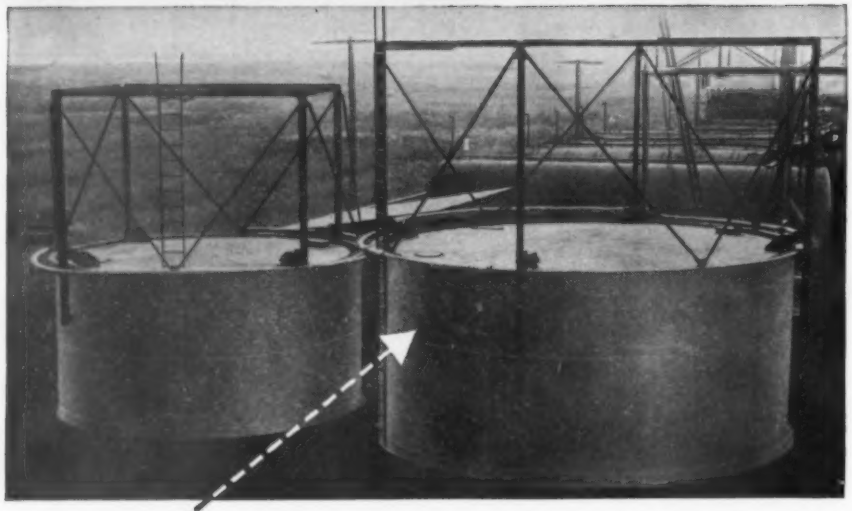
Industrial Equipment Co., well known in the Michigan area for a number of years, is located at 6435 Hamilton Ave., Detroit 2, Mich.

New Surface Preparation

The American Division of the American Pipe and Construction Co., P. O. Box 3428—Terminal Annex, Los Angeles 54, California, has announced two new products to supplement their line of Amercoat Plastic Coatings. Amercoat No. 59—Surface Preparation for Zinc, is a treatment for galvanized metal surfaces prior to application of a protective coating. Amercoat No. 60—Surface Preparation for Copper and Brass, is a similar treatment for these metals.

These surface treatment solutions are for use where shot or sandblasting are impractical. The resulting adhesion of the protective coating is excellent where applied over a zinc, copper or brass surface properly prepared by these methods.

The Tank THAT PAYS FOR ITSELF



Stacey Brothers Wet Seal Holder for digester gas—5,000 cu. ft. capacity.

It stores sewage digester gas.

With it you can reclaim valuable BTU's, the by-product of peak production, for use *when you need it.*

Many a sewage plant has found that a Stacey Brothers storage tank, designed to fit the specific need, soon pays for itself—out of the resultant savings in treatment heat and power costs.

Design, fabrication and erection are no problem to you—we take the full responsibility, and deliver the completed installation. All you have to do is turn on the valve.

Like more information? Drop us a line. No obligation.

Stacey Brothers TANKS

STACEY BROTHERS
GAS CONSTRUCTION COMPANY
5535 Vine St. Cincinnati, O.

One of the Dresser Industries

Constructor Co. to Represent Combustion Engr.

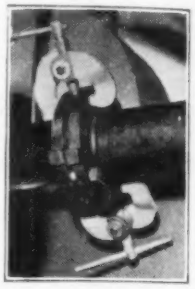
Combustion Engineering Co. has announced the appointment of the Constructor Co. of St. Paul, Minn., as sales agents in the states of Minn., North and South Dakota, and bordering territory in Wisconsin and Iowa. Representation of Combustion Engineering Co. in this territory was formerly handled by Lloyd L. Smith of Minneapolis who recently retired because of ill health. Among other equipment, the Combustion Engineering Co. manufactures the Raymond Flash Dryer System of Incinerators used in several sewage plants to incinerate sewage sludge.

Barnaby Worthington's Asst. Dir. Research

James C. Barnaby, Consulting Engineer of Worthington Pump and Machinery Corporation, has been transferred to the General Engineering Staff at the Harrison Works as Assistant Director of Research and Development.

Flange-Jacks

Flange-Jacks, a product of T. G. Persson Co., 224 Glenwood Ave., Bloomfield, New Jersey, is a new tool for opening pipe flanges, for gasket renewal quickly, easily, and safely.



These flange-jacks eliminate the hazards of hammer and chisel method, and open and close pipe flanges without damage to the flange faces. Standard size flange-jacks open all 2-in. to 20-in. flanges and hold them in perfect alignment. Further information may be obtained from the company at its Bloomfield, New Jersey, address.

Rockwell Names Marsteller Advertising Manager

William A. Marsteller has been appointed General Advertising Manager of Rockwell Manufacturing Co., Pittsburgh. Mr. Marsteller has been vice president in charge of sales, advertising, and industrial relations of Edward Valves, a subsidiary of the Rockwell Manufacturing Co.

Subsidiaries and divisions of the Rockwell Manufacturing Co. will continue to program and place their own advertising. Mr. Marsteller's work will be of a coordinating and directing nature.

Nicholson Represents Gregg Co. in South Jersey

Richards, Rusta Restor Div. Mgr.

The Gregg Co., of Philadelphia, has announced through P. S. Wilson, Vice President in charge of Rusta Restor Division, that The Nicholson Engineering Co. of Camden, N. J., has been appointed to represent Rusta Restor cathodic tank protection and Nu-Type technical coatings in the southern part of New Jersey.

Mr. A. C. Nicholson, who operates the concern, has long been active in the marine field and work with protective coatings. He was formerly Chief Engineer of W. A. Briggs Bitumen Co.

When Water Tastes
Everlastingly
GOOD

Customers Stay
SATISFIED

HYDRODARCO

Water purification by Hydrodarco, the quality activated carbon, is goodwill insurance with dependable dividends. Tastes, odors and impurities disappear . . . and so do the worries of waterworks men because they know they are giving their customers *good water* day in and day out.

DARCO
CORPORATION
60 East 42nd Street, New York 17, N. Y.
Darco: Reg. US.Pat.Off.

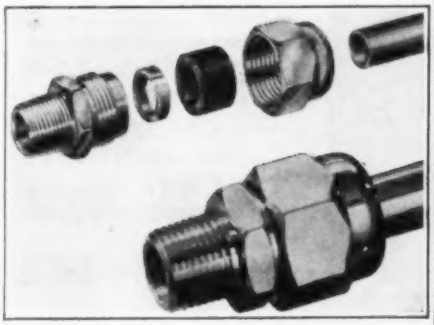
The Gregg Co. has also announced the return of Burton Richards after four years in the army, to the position of Manager of the Rusta Restor Division, with headquarters in the Philadelphia Office.

Corrosion Research Exhibit

A Corrosion Research Exhibit has been opened at the Water Service Laboratories main office in New York City. From several hundred samples of corroded pipe taken after inspection of more than 8,000 apartment and office buildings, hotels and hospitals, there has been assembled a comprehensive collection of specimens showing the various types of corrosion, and conditions created by the effects of different waters. These exhibits may be seen at 423 W. 126th St., New York City.

New Flexigrip Tubing Fitting

Flexigrip time-saving tubing fittings which eliminate end preparation or soldering of the tubing and yet produce a stronger, leakproof, and flexible joint have been announced by Gustin-Bacon Manufacturing Co. of Kansas City, Mo. The



Flexigrip fitting, made in standard sizes from ⅛ in. to 1½ in. O. D., consists of four parts—the body, a gripping ring, synthetic rubber gasket, and nut. To attach the fitting, the nut (with gasket and ring inside) is slipped over any plain-end tube, cut to desired length. The tubing end is inserted into the body as far as it will go and the nut tightened. Tightening the nut compresses the ring into a tight grip and moulds the gasket around the ring for a leak-proof seal that is so flexible it will withstand unusual vibration or impulse.

This new fitting eliminates flaring, swedging, or soldering, and adds considerably to the strength of the joint as well as saving time and

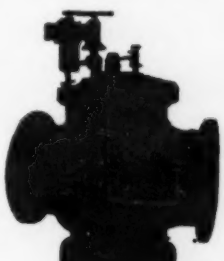
· 1879 ·
ROSS
AUTOMATIC VALVES

ALTITUDE VALVES • SURGE • RELIEF • BACK PRESSURE VALVES

FLOAT VALVES • REDUCING AND REGULATING VALVES

ALTITUDE VALVES
for
Control of elevation and heads into and out of tanks, basins and reservoirs, hydraulic control.
1. Single acting.
2. Double acting.
3. Combination assembly for three or more automatic operations.
4. Can be equipped with electric and manual controls.

COMBINATION VALVE
This valve will permit flow in one or both directions acting as
1. Pressure Reducing and Relief Valve.
2. Pressure Reducing and Altitude Valve.
3. Relief and Altitude Valve.



REMOTE CONTROL VALVE
Electric remote control—solenoid or motor can be furnished.
Adapted for use as primary or secondary control on any of the hydraulically controlled or operated valves.

ROSS VALVE MFG. CO.
INCORPORATED
P. O. BOX 595, TROY, N. Y.

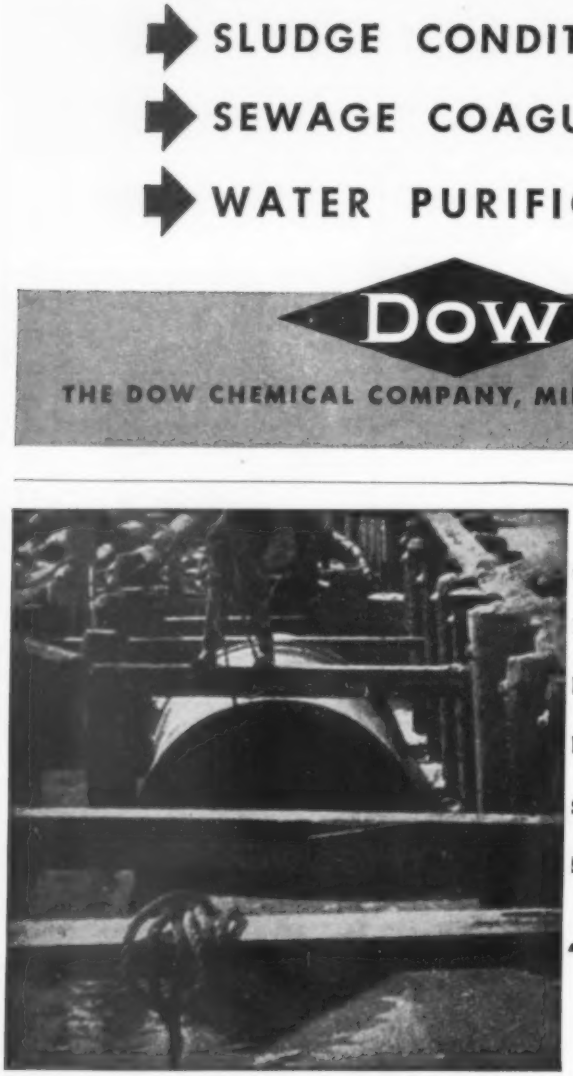
DOW Ferric chloride

35-47% SOLUTION SHIPPED IN TANK CARS 60% CRYSTALS PACKED IN 300 OR 500 POUND BARRELS

- SLUDGE CONDITIONING
- SEWAGE COAGULATION
- WATER PURIFICATION

DOW

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN



84" pipe—Spring Lake, N. J.

FLANGED PIPE

FLEXIBLE JOINT PIPE

BELL & SPIGOT PIPE

SPECIAL CASTINGS

SHORT BODY BELL & SPIGOT SPECIALS

Large stock enables us to make prompt shipments.

CAST IRON PIPE

SIZES 2" TO 84"

Warren Foundry & Pipe Corp.

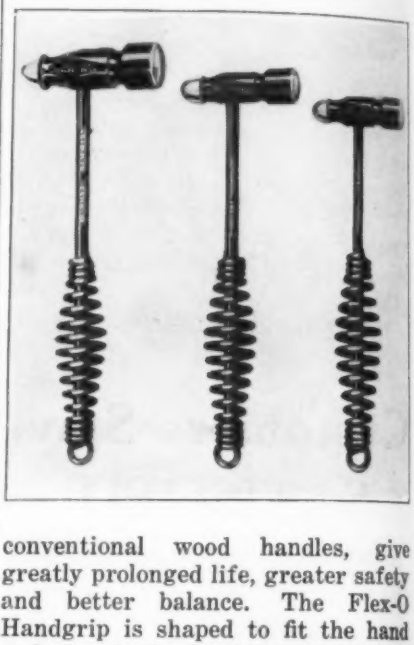
11 Broadway, New York

Warren Pipe Company of Mass., Inc.

labor. Flexigrip tubing fittings are available in brass, aluminum or steel for use on pumps, compressors, hydraulic systems, and so forth. They may be obtained from The Gustin-Bacon Manuf. Co., Kansas City, Mo.

All Metal Ball-Pein Hammers

A new all metal Ball-Pein Hammer has been developed by the Atlas Welding Accessories Company. These hammers eliminate the weakness of



conventional wood handles, give greatly prolonged life, greater safety and better balance. The Flex-O Handgrip is shaped to fit the hand and absorb shock of hammer blows. All models are available in a variety of sizes. Cost of the hammers is slightly more than the conventional type, but economy is claimed due to prolonged life of service. The Atlas Welding Accessories Co. is located at 14824 Wyoming Ave., Detroit 21, Mich.

Ranetite No. V. Transparent Waterproofing

A new improved Ranetite No. V. clear waterproof coating has been developed by The Ranetite Mfg. Co., Inc., St. Louis, Mo. By combining aluminum and calcium stearates as a base for this material, this well known waterproofing has been improved to provide an even simpler method of preventing dampness from penetrating through walls. This method of waterproofing is applicable only to virgin surfaces. Further information is available from The Ranetite Mfg. Co., St. Louis, Mo.

Chicago Bridge & Iron Reopens Detroit Office

The Chicago Bridge & Iron Company reopened its Sales Office in Detroit, Mich., on January 1st of this year. The office is located in the Lafayette Building. Edward D. Barrett, formerly of the Chicago office, is in charge of the Detroit office.

Penn Instrument Acquires Cochrane Meter Line

Penn Industrial Instrument Corp. of Philadelphia, formed by a group of men whose entire business careers have been devoted to industrial instrumentation, has purchased the Flow Meter Division of Cochrane Corp., Philadelphia.

Wm. C. Bennett

The new corporation is headed by William C. Bennett, president and general manager, with William Melas as vice president and chief engineer, and Kenneth C. Markley as vice president and works manager.

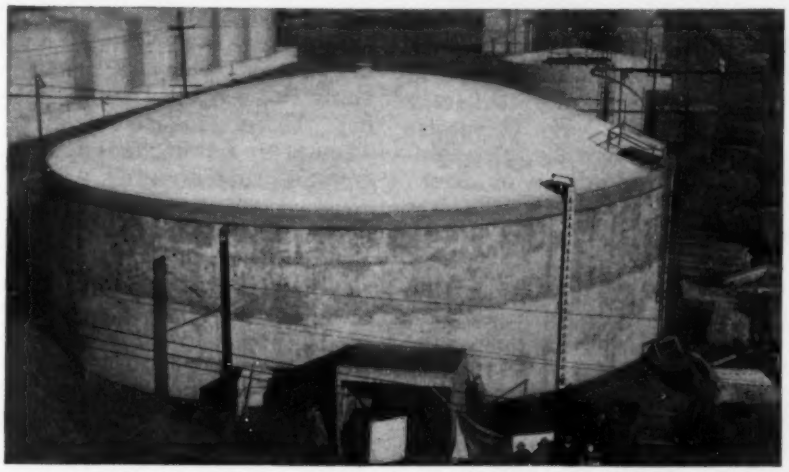
Penn will manufacture the present line of Cochrane Flow Meters exclusively for The Hays Corporation, Michigan City, Ind., who will market them under the name Hays-Cochrane Meters. Penn expects to make early announcement of a line of air-operated controllers for temperature, pressure, flow and level to be marketed directly by Penn through the present Cochrane flow meter representatives with offices in 42 cities in U. S. and Canada.

The Penn Industrial Instrument plant is at 3116 North 17th St., Philadelphia, where engineering, development and production departments and general offices are located.

L. R. Van Meter to Represent Neptune in Illinois

The Neptune Meter Company has announced that L. R. Van Meter, who has had seven years' experience as a Service Engineer with the company's Chicago office, has been promoted to the position of sales representative for the State of Illinois. He fills a vacancy left by Mr. H. A. Tolburg, who was recently appointed Chicago branch manager.

CEMENT GUN COMPANY
"GUNITE" CONTRACTORS
GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.



PRE-STRESSED "GUNITE" WATER TANK

The water storage tank shown above was built by us of "GUNITE" in 1944. The wall and dome ring girder are pre-stressed. The dome roof is also "GUNITE." It is 90' in diameter and 25' deep, and is bottle tight.

We have built scores of similar pre-stressed tanks and stand-pipes for the storage of various liquids, and also pre-stressed silo for the dry storage of chemicals.

Our new bulletin C2300 describes this work and a great many other jobs. Write for your free copy today.

MANUFACTURERS OF THE "CEMENT GUN"

MORE WATER —LESS WORRY

by CLEANING your WATER MAINS using The NATIONAL METHOD

No need to worry about reduced water main capacities just when you need every gallon you can pump. Do as many other communities — large and small — are doing: clean those old clogged up mains by using the NATIONAL METHOD of water main cleaning.

We offer you (1) greater volume of water; (2) lower pumping costs; (3) improved pressure; (4) cleaner water and (5) reduced insurance rates.

Before Cleaning — After Cleaning

GUARANTEED TO RESTORE 95% ORIGINAL CAPACITY

The National Water Main Cleaning Co.

30 Church St. — Branches: — New York 7

1221 Mortgage Guarantee Bldg., Atlanta 3, Ga.
607 First Nat'l Bank Bldg., Birmingham, 3 Ala.
115 Peterboro St., Boston 15, Mass.
205 West Wacker Dr., Chicago 6, Ill.
P. O. Box 683, Jacksonville 1, Fla.
3707 Madison St., Kansas City 2, Mo.
2028 Union Ave., Montreal 2, Can.
3812 Castellar St., Omaha 5, Neb.
210 E. Franklin St., Richmond 19, Va.
7103 Dale Ave., St. Louis 17, Mo.
501 Howard St., San Francisco, Calif.
P. O. Box 887, Waco, Texas
576 Wall St., Winnipeg, Can.

LITERATURE AND CATALOGS

Rotameters

Written so you can understand it, **Bulletin No. 45-A** of Fischer & Porter Co. is an 8 page composite bulletin on Rotameters. The bulletin contains a description of seven advantages of Rotameter for flow rate measurement and presents details on the Master Enclosed Rotameter for normal pressures and temperatures, the Armored Rotameter for chlorine, high pressures and high temperatures, meters for recording, controlling, and totalizing rates of flow, meters for very low flows and those for extremely large flows; laboratory Rotameters and others.

Also included in the bulletin are two pages of engineering recommendations for the types of Rotameters and materials of construction to be used. A free copy of Bulletin 45-A may be obtained from Fischer & Porter Co., Dept. 5-4, County Line Road, Hatboro, Pa.

Cracks in C. I. Pipe

An excellent new method for locating hairline cracks in cast iron pipe is described in the December '45 edition of **Pipe Progress** issued by the American Cast Iron Pipe Co. "The test depends on the superior penetrating property of turpentine and its wetting power on dry Portland cement powder. To apply the test, first clean and wipe dry the surface to be inspected. Then apply a thin coat of turpentine using a brush or spray, wipe off the excess turpentine and immediately dust on a thin film or coat of dry Portland cement. The turpentine that has penetrated into the crack is absorbed by the dry cement and reveals the crack location by showing a wet streak directly over the crack. The spit end of the pipe is the first and most logical place to look for cracks.

"The dry cement can be dusted on by a number of methods, including a salt shaker, burlap bag, tobacco sack, etc. The sensitivity of the method is superior to visual inspection, in that the smallest hairline cracks are revealed by the test. The inspection can be performed at the trench without seriously delaying the laying program.

"In the case of large diameter pipe where the removal and replacement of a cracked spigot becomes a major and costly operation, the inspection of all spigot ends by this method before installation may be fully justified."

In addition to the above idea, the last issue of **Pipe Progress** for 1945 contains a story of Houston's water supply, the use of mechanical joints at Frankfort, Ky., as well as the method of making a centrifugal pipe on assembly-line plan at Acipco's factory.

To get your name on the mailing list for **Pipe Progress**, write to the American Cast Iron Pipe Co., Birmingham, Ala.

Safety Appliances

A new, complete 178 page 6-B catalog has been published by the Mine Safety Appliances Co. This catalog describes and illustrates the complete range of M.S.A. safety equipment. Included is a 6 page introductory section illustrating and describing the complete research laboratories and plant facilities of the company.

The regular edition of the 6-B catalog is in the 8½ x 11 inch size.

RUST & BITUMINOUS ENAMEL CORROSION

There is only one means of permanent protection against the inroads of oxidation — that's *Bituminous Enamel*

We are nationally known approved Applicators of Bituminous Coatings for treating Steel Standpipes, Elevated Water Tanks, Water Mains, Penstocks, Lockgates and other Water Works installations.

IN CASES REQUIRING CATHODIC PROTECTION, WE RECOMMEND BITUMINOUS COATINGS TO ELIMINATE CORROSION AT WATER LEVELS AND ABOVE.

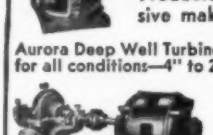
SEND FOR FREE BOOKLET

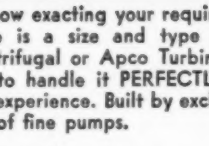
W. A. BRIGGS BITUMEN Co.
3303 Richmond Street,
PHILA. 34, PA.

They Will PROVE to You How GOOD They Are
PUMPS "by Aurora"

No matter how exacting your requirements, there is a size and type of Aurora Centrifugal or Apco Turbine-Type Pump to handle it PERFECTLY. Products of experience. Built by exclusive makers of fine pumps.

Aurora Deep Well Turbines for all conditions—4" to 24"

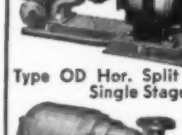




Type AD Hor. Split Case, Two Stage Centrifugal

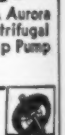
NSA Aurora Centrifugal Sump Pump

Type OD Hor. Split Case Double Suction Single Stage Centrifugal



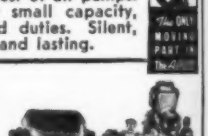
Type G M C Close-Coupled Centrifugal

Apco Turbine-Type Pumps
The simplest of all pumps. Ideal for small capacity, high head duties. Silent, compact and lasting.



Type GGU Side Suction Single Stage Centrifugal

APCO Horizontal Condensation Return Unit



APCO Single Stage Turbine-Type

Write for CONDENSED CATALOG M or See Our Catalog in SWEETS.

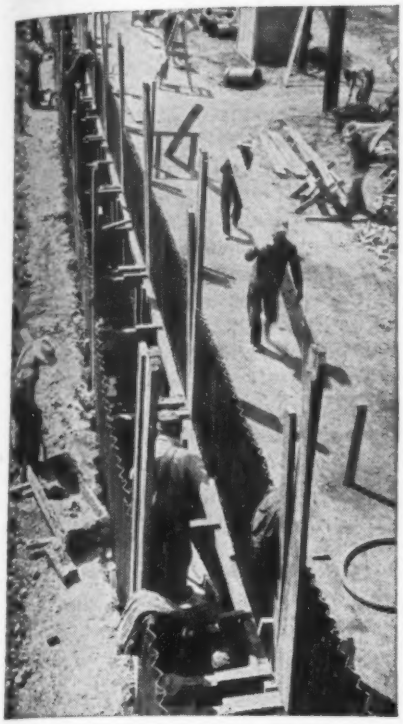
DISTRIBUTORS IN PRINCIPAL CITIES

AURORA Always PUMPS

AURORA PUMP COMPANY

68 Loucks Street, AURORA, ILLINOIS

JOBS GO FASTER.. with steel sheeting



In many cases, ARMCO Sheeting can be driven the full depth before excavating.

Let's see how ARMCO Sheeting does it—

This sturdy, light-weight sheeting goes in fast and easily because of its smooth surface and small displacement. It can readily be pulled and used over and over again, thus saving time and materials.

Another important advantage of ARMCO Sheeting is that you can order in the exact gage and type you need. The interlocking type, used where watertightness is desired, has a covering width of 14 inches and comes in 12 to 7 gage. The flange type, commonly used in sheeting trenches, is 12 inches wide and comes in 12 gage and heavier. Standard lengths of both types run from 6 to 20 feet or more. Write for complete information. Armco Drainage & Metal Products, Inc., and Associated Companies, 105 Curtis St., Middletown, Ohio.

★ ARMCO ★

ARMCO SHEETING

Also available is a new handy pocketsize edition of the catalog 5 x 6½ inches, containing the same material and number of pages as the larger edition. Copies of either size may be secured by writing to the Mine Safety Appliances Co., Pittsburgh 8, Pa.

Safe Practices

Now you can have your choice—You can now obtain one binder for all of the safe and health practices pamphlets issued by the National Safety Council, Inc. The new **Safe Practices and Health Practices** pamphlets list has been issued and may be obtained from the National Safety Council. If you are interested in safe practices for your plant, (and you should be) certainly some of these Safe Practices pamphlets will be helpful to you. Write the National Safety Council, Inc., 20 North Wacker Drive, Chicago 6, Ill.

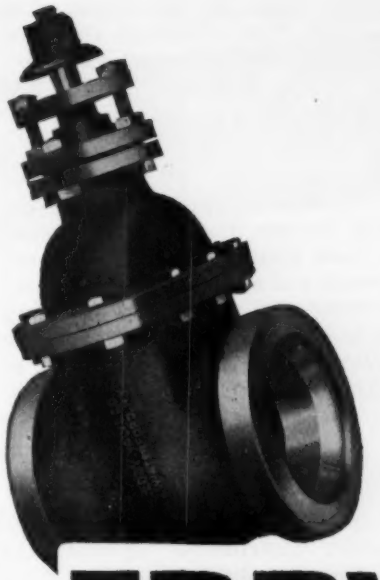
Handling Chlorine

Our good friend, Bob Quinn, has co-authored with G. P. Vincent of the Mathieson Alkali Works an article on **Liquid Chlorine** and methods that reduce risk in handling it. A reprint of this article, which appeared in the *National Safety News* for April, 1945, may be obtained from the Mathieson Alkali Works. The article itself discusses the properties of chlorine, various containers, equipment for handling chlorine, dealing with leaks, and first aid. Pictures of valves and testing equipment are shown. The Mathieson Alkali Works, Inc., is located at 60 East 42nd St., New York 17, N. Y.

Jet Pumps

We don't know whether to pronounce it Derbyshire or Darbyshire, but Catalog No. 3 on **Derbyshire Jet Pumps**, foot valves and strainers for marine service, is a catalog of applications for jet pumps, several of which would appear to find ample use in water and sewage works. For example a Derbyshire Jet Pump might be employed for centrifugal priming, either manual or automatic. Similar pumps, pilot float operated, diaphragm controlled, may be used for sewage or sump tanks.

At the end of this 40-page bulletin is a technical section devoted to a summary of the liquid Jet Pump theory and losses, and a Jet Pump



EDDY *Valves* *and* HYDRANTS

WILL THE MEN WHO FOLLOW YOU SAY YOU "KNEW YOUR STUFF"?

They will if you put in valves and hydrants now that will still be trouble-free in years to come. To be sure of this, specify EDDY—when you buy. EDDY products have been built by men with three generations of specialized experience. Eddy products have served three generations of water works men exceptionally well. Buy the product you know you can depend on.

EDDY FOR LONG SERVICE

EDDY VALVE COMPANY
WATERFORD, NEW YORK

Selection Chart in the form of a nomograph from which can easily be determined the size and capacity, static suction head and friction loss of a pump for any particular problem or characteristic.

Although these Jet Pumps have been developed primarily for marine service, we are thoroughly convinced that both water and sewage works engineers and superintendents should look into the possibility of using them in water and sewage plants. We suggest you write to the Derbyshire Machine & Tool Co., Philadelphia 44, Pa., for Catalog No. 3.

C. I. Pipe

It is interesting to know that the Honolulu distribution system had only four breaks during the Pearl Harbor attack, and that cast iron sewage outfall lines were floated into place by Seabees in the Pacific. This and other interesting information of similar nature may be found in the January '46 issue of **Cast Iron Pipe News**. If you are not on the mailing list for this regular bulletin, write to the Cast Iron Pipe Research Association, Peoples Gas Building, Chicago 3, Ill.

Liquid Level Controls

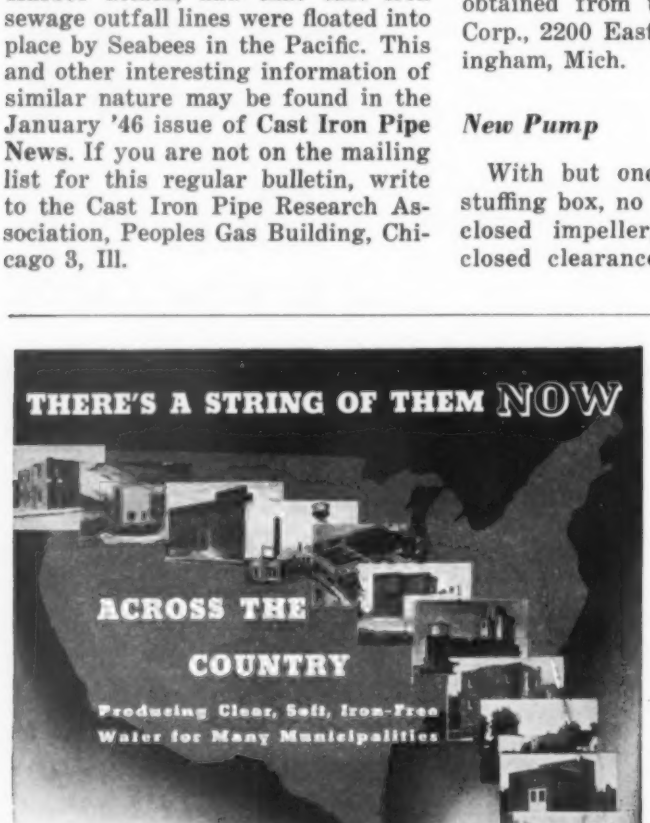
In the field of water purification and sewage treatment are many instances where liquid level control is essential. No doubt in many instances **B/W Control**, as described in Catalog No. 145, would be of particular use. These B/W floatless liquid level and industrial controls are thoroughly described in Catalog No. 145, which contains a discussion of the principles and operations of B/W relay, pictures of the relay switches, wiring diagrams, starter and relay combination, multiple pump controls, special controls and panels, electrodes, magnetic contactors, automatic starters, and many other types of controls. Also included in the Catalog 145 are 16 application diagrams. This catalog may be obtained from the B/W Controller Corp., 2200 East Maple Road, Birmingham, Mich.

New Pump

With but one running part, no stuffing box, no mechanical seal, no closed impeller, no governor, no closed clearances, and no circulation of air or liquid through the seal, the **LaBour Type G Pump** as described in Bulletin 51 appears to be a radically new approach to an old pumping problem. This Type G pump is a vertical, self-priming centrifugal Hydrobalance pump with a Hydrobalance seal, according to the bulletin. The pump is suited to a variety of common applications as, for example, sump or drainage service, bilge, mine dewatering, irrigation, and transfer of liquids. The bulletin contains operating information as well as other useful data and a discussion of applications of the pump. It might be well worth looking into if you have a pumping problem coming up, and the LaBour Co., Inc., Elkhart, Ind., will be pleased to send you this Bulletin 51 if you will write for it.

Pioneers in History

One day last December there came to our desk a beautifully bound, and very interesting looking book of some 160 pages. It looked so interesting that we laid it aside for a few days in order to find more time for going through it. It was more than a month before we picked it up again, only to realize that we



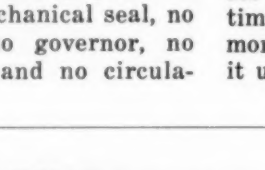
ACCELATORS are doing a lot of different things for a lot of different kinds of water . . . clarifying . . . softening . . . stabilizing . . . removing color . . . taking out iron.

Results are always excellent . . . frequently remarkable.

You can't beat ACCELATORS for Performance and Economy. Would you like Bulletin 1824?

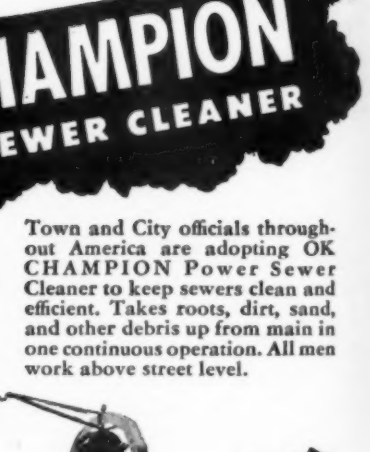
INFILCO
INCORPORATED
325 W. 25th PLACE, CHICAGO 16, ILL.

KEEP SEWERS OPEN with OK CHAMPION POWER SEWER CLEANER



Town and City officials throughout America are adopting OK CHAMPION Power Sewer Cleaner to keep sewers clean and efficient. Takes roots, dirt, sand, and other debris up from main in one continuous operation. All men work above street level.

Pulling forward opens the jaws that bite into obstructions. Reversing the pull on the bucket automatically closes jaws which hold load pulled back to street level. Write for complete details.



CHAMPION CORPORATION 4718 SHEFFIELD HAMMOND, IND.

had laid aside a story of **Pioneers In History.** A story of 115 years of Fairbanks, Morse & Co., a company that has grown up with America. The book, profusely illustrated with color photographs, tells the story of two famous men, Thaddeus Fairbanks and Charles Hosmer Morse, the founders of Fairbanks, Morse & Co.

The book itself is divided into two parts, one of which deals with pioneering and development of various products of the company, including the period of 1830 to 1870 when scales were the principal product. This period was followed by windmills, pumps, railroad equipment, gasoline engines, ball-bearing motors, and lastly Diesel engines. Part II, comprising the latter part of the book, is devoted to the story of Fairbanks, Morse & Co. today, with sections on production, the operation of the company during World War II, and the application of various products of the company to the modern business and mechanical world. Photographs of F-M powered boats, F-M powered light and water plants, industry, irrigation, flood control, water purification, and sewage disposal among other things are shown as examples of Fairbanks-Morse in modern life.

We doubt that this expensively produced Anniversary Number is available for general distribution; but, if interested, write and ask Fairbanks, Morse & Co., 600 South Michigan Ave., Chicago 5, Ill.

Gas Holders

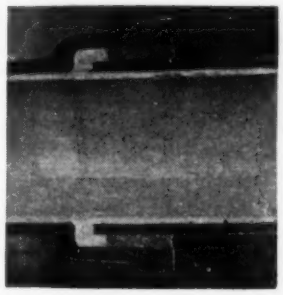
Now that some thought is being given to the collection, storage and use of sludge digestion tank gas in post-war projects, engineers and operators alike should be interested in **Stacey Bros. Wet Seal Gas Holders** as a possible adjunct to the gas collection-storage system plan. Write to the Stacey Brothers Gas Construction Co. for Bull. No. W-45. The company is located at 5535 Vine St., Cincinnati 16, Ohio.

Piping Handbook

Newly revised and enlarged by nearly 500 pages Sabin Crocker's comprehensive **Piping Handbook** is now available. In this one handy volume appears a complete treatise on piping fundamentals and practice and a working guide for all industrial users of piping. The chapter on water supply piping is considerably expanded, and there is

The TATE Cement Lining Process
Restores efficiency of old Water Mains

Now is the time to investigate the Tate Cement Lining process —and see what it can do to restore the efficiency of your old water mains.



View showing Tate Process in Pipe Joint. Note thoroughness of Lining.

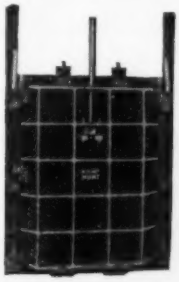
Write for Literature.

What the TATE Process accomplishes

1. Water mains cleaned and cement-lined without removing pipe.
2. Eliminates discoloration and further cleaning costs.
3. Reduces pumping costs.
4. Restores reduction in head and flow co-efficients. This means full fire protection and lowered insurance rates.
5. All joints cement-lined . . . just one continuous pipe.
6. Does the job without interruption of service to consumer.

TATE PIPE LININGS, Inc.
ANDOVER, MASS.

RODNEY HUNT



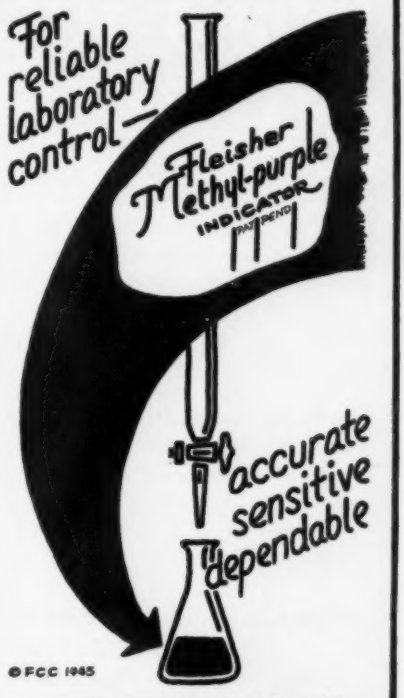
GATES and HOISTS

Metal or timber sluice gates of all sizes and designs, approved by engineers everywhere. Improved gate stands and hoists for hand or motor operation. Also flap and mud valves, shear and filler gates, trash racks and rakes. Dependable canal equipment from dam to tail-race since 1840.

Write for Special Catalog Today!

RODNEY HUNT

RODNEY HUNT MACHINE CO.
118 Lake St., Orange, Mass., U. S. A.



Replaces "old fashioned"
Methyl-Orange Indicator
Samples and literature available upon request
FLEISHER CHEMICAL COMPANY
Benjamin Franklin Station
Washington 4, D.C.

FOR BETTER
pH Control
and WATER TESTS
there is nothing like
NON-FADING
GLASS COLOR
STANDARDS
Pocket
Comparator
No. 605
Permanent reliability of Hellige Glass Color Standards, accuracy of color comparison, simplicity of the technique, and compactness of the apparatus are exclusive features of Hellige Comparators not found in any similar outfits.
WRITE FOR BULLETIN No. 602
HELLIGE
INCORPORATED
3718 NORTHERN BLVD. LONG ISLAND CITY 1, N.Y.
HEADQUARTERS FOR COLORIMETRIC APPARATUS

HYDRO-TITE
HYDRO-TITE — The self-caulking joint compound that makes cast iron water pipe joints — strong — tight — flexible and everlasting. Used on thousands of miles of pipe with a record of more than 30 years without a failure.
FIBREX — The sanitary paper packing that is used like braided jute. Free from bacteria — treated with a water repellent — put up in 60 pound reels. 70 pounds of Fibrex takes the place of 100 pounds of braided jute.
HYDRAULIC DEVELOPMENT CORPORATION
50 Church St.
New York, N. Y.
DRY BRAIDED
Fibrex

new material for hydraulic engineers in the section on flow in water pipes. This 4th Edition, containing 1376 pages, 334 illustrations and 329 tables retails for $7.00 from the McGraw-Hill Book Co., 330 West 42nd St., New York 18, N. Y.

Pipe Lines Quotes

Perhaps we should have been most interested in the article on "Clay Pipe Sewers Serve Chicago's Famous Clearing District," that is the industrial district on Chicago's Southwest Side, the story which appeared in the Jan.-Feb. issue of **Clay Pipe News**, and we were duly interested, but the items which really took our eye were the following *"Pipe Lines"* which we believe are worth quoting:

"What this country needs is not a new birth of freedom, but the old-fashioned $2.00 lower berth.

What this country needs isn't more liberty, but less people who take liberties with our liberty.

What this country needs is not a job for every man, but a real man for every job.

What this country needs isn't to get more taxes from the people, but for the people to get more from taxes.

What this country needs is not more miles of territory, but more miles to the gallon.

What this country needs is more tractors and less distractors.

What this country needs isn't more young men making speed, but more young men planting seeds.

What this country needs is more paint on the old place and less paint on the young face.

What this country needs isn't lower rate of interest on money, but an increased interest in work."

Clay Pipe News may be obtained from the Clay Products Association, 111 West Washington St., Chicago 2, Ill.

Safety and Relief Valves

Just in case you have been using the words safety and relief valves interchangeably, we suggest that you obtain the new catalog No. 45 on **Safety and Relief Valves** issued by the Farris Engineering Co., for it is divided into two sections, Relief Valves, and Safety Valves.

The catalog contains new valve designs as well as improvements in old designs. The pictorial index shows line drawings of all the basic Farris valve types. With this index a user can pick out the valve he needs without having to thumb through a whole catalog. Opposite the index is a detailed index showing what the valve can be used for and where to find the specifications in the catalog. A supplement to catalog 45 is catalog No. 45A, which presents a pricing innovation for those interested in obtaining the valves. A copy of the new catalog, and its supplement, may be ob-

Saves time
All old-timers know the advantages of making connections with the MUELLER "B" Machine. Drills holes in water mains, taps them, and inserts or removes corporation stops. All under pressure, too! No water shut-off, no trouble, no muss. Saves time also. Your men will like it. They can make better connections. Sizes ½" to 1" inclusive. . . . Write us today.
MUELLER CO. FOUNDED 1857
DECATUR 70, ILL. LOS ANGELES 23, CALIF.

Over 225 P. F. T. Floating Covers in War Service
The health of our fighting men and war workers is being safeguarded by modern sewage disposal plants. We are doing our part by delivering on time P.F.T. Floating Covers and other sewage treatment equipment.
The P.F.T. Floating Cover for single and stage digestion hastens the digestion process, and provides for utilizing the sewage gas to heat water for the digester tank.
Catalog No. 232 contains complete information, including specifications. Write for your copy.
P.F.T.
PACIFIC FLUSH-TANK CO.
4241 Ravenswood Ave., Chicago, Ill.
New York Charlotte, N. C.

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VOGT BROTHERS' TRAFFIC MODEL FIRE HYDRANT

A.W.W.A.

VOGT BROTHERS MFG. CO. Incorporated LOUISVILLE, KY.

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AERO-MIX AERATION - MIXED

AERATOR—MIXER

A Size and Type to Fit Your Problem In Water or Sewage Treatment.

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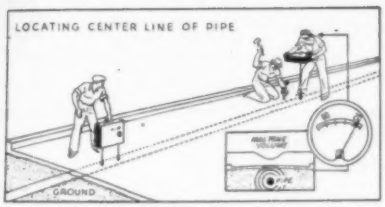
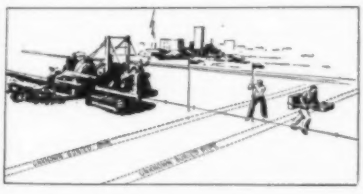
M-SCOPE





BURIED PIPE AND CABLE FINDER

16 PAGE BOOKLET FREE UPON REQUEST

FISHER RESEARCH LABORATORY

Palo Alto, California

tained by writing the Farris Engineering Co., 400 Commercial Ave., Palisades Park, N. J.

Rubber Base Floor Covering

Paratex is back! So says the January 1946 issue of **Building Maintenance,** published by Truscon Laboratories, Inc., of Detroit. Paratex is a rubber base floor coating, which has the toughness of rubber and the resistance of rubber to chemicals and yet sets up quickly because of its fast drying properties. It is said to outwear floor and deck paints, may be obtained in color, and according to one illustration makes a show place of a municipal pumping station inasmuch as it holds down the dust, is easily cleaned and beautifully colored. Copies of *Building Maintenance,* or bulletins on Paratex, may be obtained from the Truscon Laboratories, Inc., Detroit, Mich.

Valves: Stop, Check, Globe, Etc.

On the front of a catalog titled **Edward Better Valves** it shows that these valves are for boiler rooms, petroleum service, industrial and technological plants. On browsing through this 20-page catalog it would appear that some of these valves would find use in water and sewage works. These are globe and angle stop valves, relief valves, check valves, non-return valves, blow-off valves, gate valves, strainers and intake valves. These latter are integral seat valves for high pressure work. This catalog is a condensation of the master catalog No. 103, either or both of which may be obtained from Edward Valve & Manufacturing Co., Inc., East Chicago, Indiana. The Edward Valve Co. is now a subsidiary of the recently formed Rockwell Manufacturing Co.

Glassware for Laboratory

All of you chemists, bacteriologists, technicians, and laboratory engineers should write to the Corning Glass Works, Corning, N. Y., for Catalog LP 24, **Pyrex Laboratory Glassware.** That is, you should write for it if you don't already have it in your file. A 168 page catalog containing seven parts should certainly contain some apparatus your laboratory needs. You'll find the catalog is complete in every detail and shows Pyrex Laboratory Ware, Vycor Ware,

LEADITE

The Pioneer Self-Caulking Material for C.I. Pipe

TABLE OF COMPARATIVE QUANTITIES

Nominal inside dia. of pipe, in.	Depth of joint, inches of Leadite	Approx. lbs. of Leadite per joint	Depth of joint, inches of lead	Approx. lbs. of lead per joint
4	2.5	2.00	2.25	8.56
6	2.5	3.00	2.25	11.71
8	2.5	4.00	2.25	14.63
10	2.5	5.00	2.25	17.70
12	2.5	6.00	2.25	20.86
14	2.5	7.00	2.25	24.02
16	2.5	8.25	2.25	33.07
18	2.5	9.25	2.25	36.88
20	2.5	10.50	2.25	40.71
24	2.5	13.00	2.50	53.02
30	2.75	16.00	2.50	65.36
36	2.75	19.00	2.50	77.96
48	3.50	30.00	3.00	121.15
54	4.0	38.00	3.00	135.60
60	4.0	42.00	3.00	150.70

THE LEADITE COMPANY

Girard Trust Co. Bldg., Philadelphia, Pa.

No Caulking

ODOR and TASTE are health factors too...

The WATER SUPPLY that pleases nose and palate is an important contribution to community health — people drink more of it.

ESOTOO* is the answer to a simple, sure, and more economical method of controlling residual chlorine — especially in "break-point" chlorination.

ESOTOO* is the Ideal De-Chlorinator.

*ESOTOO is "Virginia's" Trade Name for Liquid Sulfur Dioxide.

VIRGINIA

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WEST NORFOLK, VIRGINIA

Fritted Ware, Lifetime Red Low Actinic Ware, Alkali Resistant Ware, Tubing and Rods. Remember, it's the Corning Glass Works, Corning, N. Y.

Synthetic Rubber

If you want to keep abreast of applications of synthetic rubber, and particularly if you want facts about Neoprene, by all means have your name put on the mailing list for the **Neoprene Notebook** of the Rubber Chemicals Div. of Du Pont.

With No. 34 in the series, publication of this **Neoprene Notebook** (begun in 1938 and discontinued in 1942) has been resumed.

Of particular interest in this issue is an article on a Neoprene "Go Devil" used in cleaning water mains and oil pipe lines. This "Go devil," called a Rotary Pipe Crawler, comprises a neoprene ball, hollow or solid, encased in a mesh-like harness of heavy chain.

In one instance reported, a 20-in. main 12,800 ft. long was cleaned using a ball 19½ in. in diameter. Water was added to the ball to effect bottom cleaning and the ball filled with air for top cleaning. Four passes were made in each condition. Time of passage varied from 30 to 46 minutes. The ball will flatten to follow changes in contour of the pipe. After cleaning, the head loss was reduced from 35.4 ft. to 16.3 ft. per 1,000 ft. of line. The ball was unaffected but the chains were worn out in the cleaning process.

For more information, write to The Rubber Chemical Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Industrial Water Handbook

It's worth it. Priced at $1.00 per copy, postage prepaid, the Betz **Handbook of Industrial Water Conditioning,** contains 54 chapters and is divided into two sections. The first section entitled "Water Treatment" contains detailed discussions of chemical and mechanical processes for the treatment of water for industrial use. The second section entitled "Water Analyses" deals with the impurities in water, how they originate, how they can be removed, and methods of analyses suitable for plant control. This handbook is published by, and may be obtained from, W. H. and L. D. Betz, Philadelphia 24, Pa.

Booms and Depressions

Right now, as we are in the midst of reconversion problems, and are on the verge of a business boom, and on the precipice of inflation, it might be well to look back over our history and see what caused and resulted from **Business Booms and Depressions Since 1775.**

The Hardinge Co. of York, Pa., makers of water and sewage works equipment, has made it possible for you to study these ups and downs, quickly, easily, and thoroughly. In a well developed graph covering the 170 year period from 1775 to date, fluctuations in wages, price trends, national income, Federal debt and business activity are clearly shown.

In addition to the graphs, also shown is how much a dollar actually bought in 1815, 1864-65, 1920 and 1945. Below the graph are several short, pertinent, and enlightening paragraphs on the items mentioned above.

If you're a buyer of either goods or services you should write the Hardinge Co., York, Pa., for this very interesting and informative graph.

AMERICAN-Standard GAS BOILERS
STEAM AND WATER TYPES
FOR DIGESTER HEATING
SEE DATA PAGE IN ANNUAL REFERENCE SECTION
AMERICAN-Standard
HEATING PLUMBING
Serving the Nations' Health and Comfort
American Radiator & Standard Sanitary Corporation, Pittsburgh 30, Pa.
SALES OFFICES IN ALL PRINCIPAL CITIES

MECHANICAL EQUIPMENT BY ROBERTS FILTER MFG. CO. DARBY, PENNA.

KNOWN AROUND THE WORLD AS THE SIGN OF EXCELLENCE IN WATER TREATMENT EQUIPMENT

The years of experience behind the Roberts nameplate is your assurance that any water rectification problem is expertly handled to your best advantage. As manufacturing and installation engineers, the Roberts organization is equipped to meet your exact needs regardless of the size of the equipment or the complexity of the problem.

GRAVITY FILTERS • SOFTENING PLANTS AND EQUIPMENT • PRESSURE FILTERS ZEOLITE SOFTENERS • SWIMMING POOL RECIRCULATING APPARATUS SPECIAL WATER TREATMENT EQUIPMENT

We invite your inquiries
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for CONCRETE and STEEL!
Inertol Protection Means Lowest Cost Per Year
INERTOL COMPANY, INC. NEWARK 5, NEW JERSEY and SAN FRANCISCO 7, CALIFORNIA

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Synchronous Motors

According to a news release from the Electric Machinery Mfg. Co., their new 4-page folder **No. FF-11** describes money saving performance features of synchronous motors. The 4-page folder illustrates and describes 8 of the economies and operating advantages gained by the use of synchronous motors engineered to large, constant-speed applications. Also shown are examples of synchronous motors direct-connected to various types of drives.

Beautiful American Names

One of the intriguing things about America is the strange and beautiful names that are given to cities, rivers, forests, and mountains. One that is particularly intriguing is the Hetch Hetchy Reservoir of the San Francisco Water and Power System, the story of which appears in **The Pittsburgh-Empire Water Journal** for Nov.-Dec. The article, by N. A. Eckhart, also names other water supplies with beautiful names: Lake Eleanor, Priest Reservoir, Moccasin Regulating Reservoir, Pilarcitos Reservoir, Crystal Springs Reservoir, etc.

Then there is the story in this issue of the Belgrave Sewage Treatment Plant, built for beauty and efficiency. This is the same Belgrave Plant about which T. M. Riddick wrote in *Water Works and Sewerage* last year. The article in the *Water Journal* is by H. O. Johnson, Supt. of the Belgrave Sewer District. Speaking of names, in this same issue Thos. L. Amiss, Supt. of Water and Sewerage at Shreveport, La., writes of the history of the Shreveport Water Works and its Cross Bayou, Twelve Mile Bayou, Caddo Lake and Red River.

The *Water Journal* is a complimentary magazine published by Pittsburgh-Equitable Meter Co., Pittsburgh 8, Pa.

Instrumentation

A new post-war general catalog entitled **Specification Index for Bristol Instruments** has been issued by the Bristol Co. The catalog, No. W-1800, contains information on automatic controlling, recording, and indicating instruments. Specification data are given on each instrument listed. A copy of catalog No. W-1800 may be obtained from the Bristol Co., Sales Promotion Dept., Waterbury 91, Conn.

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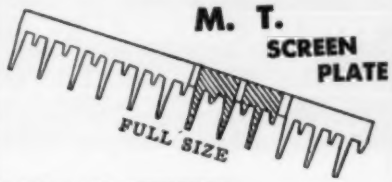

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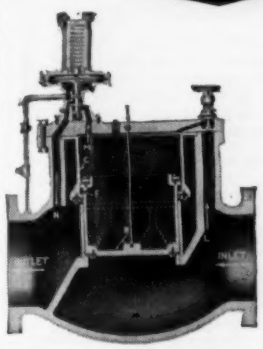

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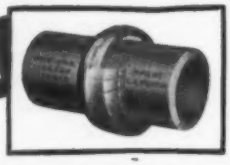

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Welding

It's true, most of our readers are not as interested in welded fabrication as are engineers and designers, but with welding becoming more and more important in maintenance and repair work around water and sewage works, we think you might be interested in a bulletin entitled **Tailoring in Metal.** Offered by the United Welding Co. of Middletown, Ohio, the book discusses factors af-

POSITION WANTED

Superintendent and operator of activated sludge plant and of primary treatment plant, with four years' experience, desires new position. Finest references. Box 2005, Water & Sewage Works, 330 S. Wells St., Chicago 6, Ill.

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By graduate (Ph.D.) Sanitary Chemist and Engineer. Experienced in water purification, sewage treatment, laboratory routine and research, plant supervision, operation, maintenance and design, main sterilization, and consulting. Possess good foundation for management. Now employed. Box 2006, Water & Sewage Works, 330 S. Wells St., Chicago 6, Ill.

POSITION WANTED

Desire position as Water Works Superintendent, Plant Superintendent or Engineer. Age 38, Graduate Sanitary Engineer, Iowa University, member A. W. W. A., 10 years' experience in design and operation of coagulation and filtration, lime-soda and zeolite softening plants with considerable experience in chemistry, bacteriology and microscopy. Held position of Sanitary Engineer (Rank of Captain), U. S. Army, where extensive work was accomplished on sanitary surveys of water and sewage, public health problems and public utility problems in Military Government. Also 2½ years highway surveying and construction. Address Box 2007, Water & Sewage Works, 330 S. Wells St., Chicago 6, Ill.

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By graduate Chemical and Sanitary Engineer with twenty years comprehensive experience in water purification. Also supervision, maintenance, and operation of wastes, sewage treatment and water conditioning plants, municipal and industrial. Now employed, but available in 90 days. Box 1368, Water & Sewage Works, 155 E. 44th St., New York 17, N. Y.

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CONTROL ENGINEER in water purification. Employed in this capacity for the past four years in forty m.g.d. filtration plant and sewage disposal system. Coll. graduate, Chem. major. West or Southwest preferred. Box 2002, Water and Sewage Works, 330 So. Wells St., Chicago 6, Ill.

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College Graduate with twelve years' experience in industrial and domestic water conditioning, including acidification, algae and slime control, chlorination, chloramines, demineralization, boiler feedwater (external, internal), iron removal, cooling water, settling and filtration, lime softening, taste and odor, zeolite softening, etc. 37 years old; married; Member of A.W.W.A. Address Box 2003, Water and Sewage Works, 330 So. Wells St., Chicago 6, Ill.

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Paper Pulp Recovery

With all of the attention that has been focused on paper mill wastes within the last year or so, by Dr. Harry Gehm and his co-workers, it is not surprising to see an article in the **Link-Belt News** on the recovery of pulp from paper mill waste white-water. The particular plant described is that of the Beach & Arthur Paper Co., at Modena, Pa., where a Link-Belt sludge collector in a rectangular settling tank is used, resulting in the recovery of 18,000 pounds of reusable pulp every 24 hours. Link-Belt News is published by the Link-Belt Co., and may be obtained by writing to the Chicago address, 307 North Michigan Ave., Chicago 1, Ill.

Swat That Fly Again!

Not too many months ago we printed an article titled "Swat That Fly!" in which we set forth some comment on ways and means of killing flies in and around sewage treatment plants as well as elsewhere. Now comes a story on a "New Era in Pest Control" in the December, 1945, issue of the **Rohm & Haas Reporter.** This new era concerns the latest insecticide developments utilizing the Lethanes (organic thiocyanates) which when mixed with DDT increase the knockdown rate for flies. The Lethanes and their high knockdown rates have been known for years as a substitute for the less effective and highly variable pyrethrum extracts.

Rothane D-3 is a new insecticide with a killing power equal to DDT but with less toxicity to humans and warm blooded animals. Its killing action, however, is slow and the Lethanes are expected to increase its knockdown power. Other stories of interest in the organic chemical field including ion exchange resins for softening water are to be found in the *Rohm & Haas Reporter,* which may be obtained from Rohm & Haas Co., Washington Square, Philadelphia 5, Pa.

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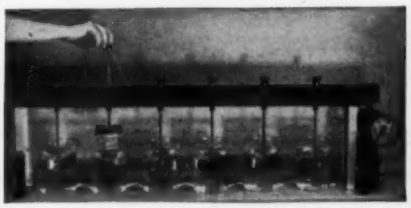

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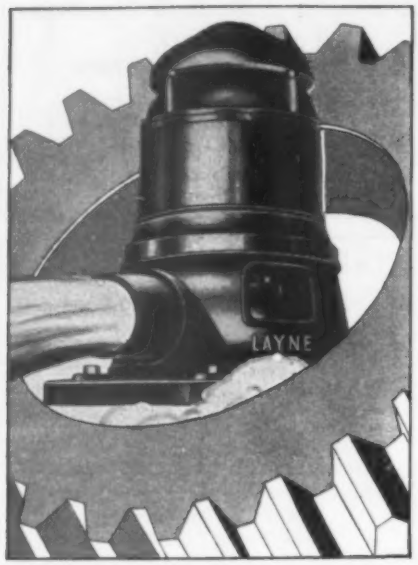

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LAYNE

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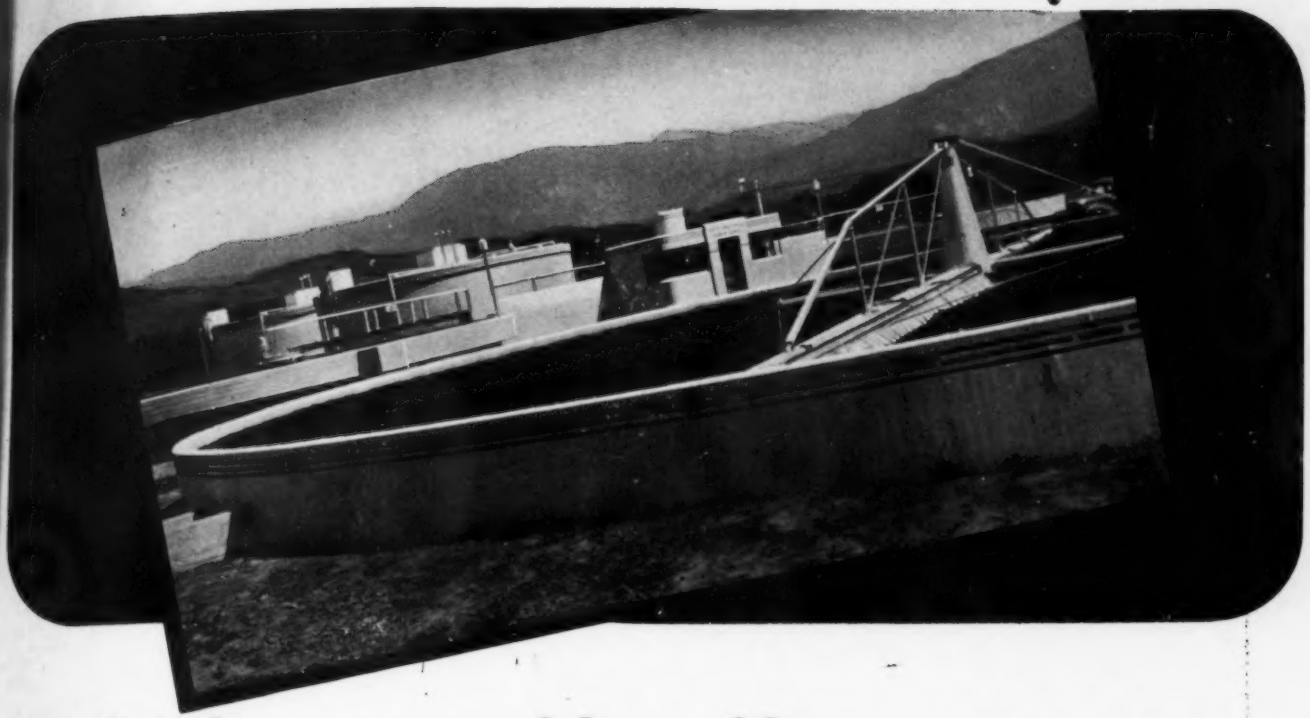

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This Dorrco differs radically from the conventional type distributor in both construction and results. It is designed specifically for handling large volumes at low head—an ideal design for any method of high-rate trickling filter treatment.

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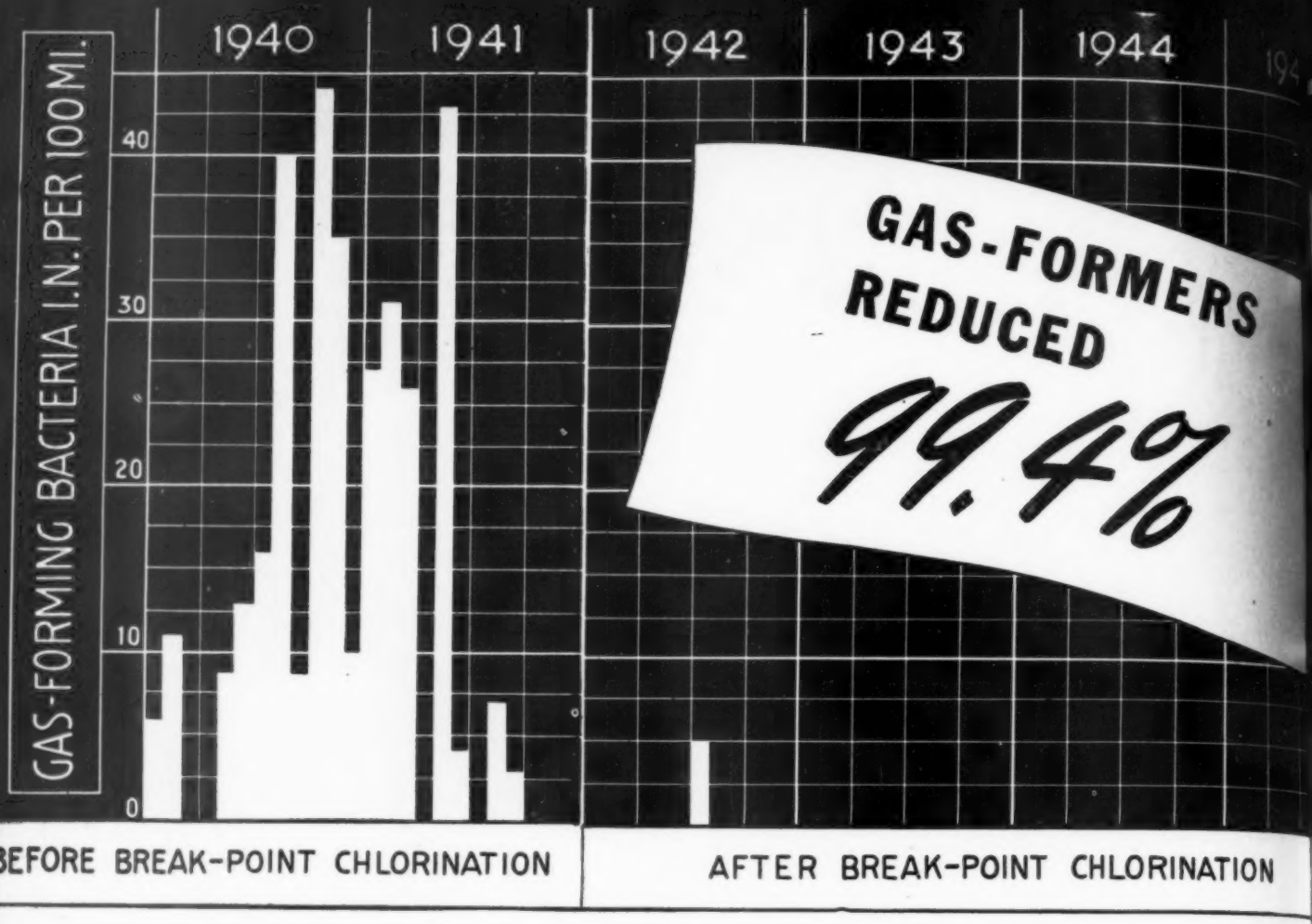

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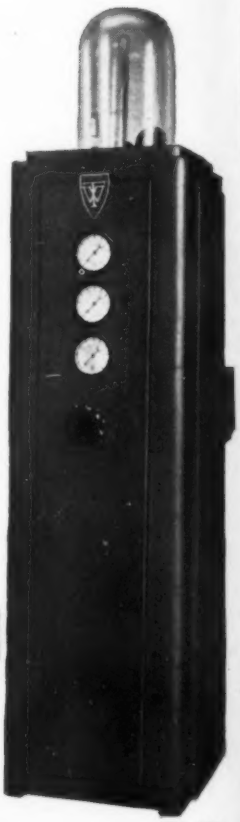
BACTERIOLOGICAL DATA

	BEFORE B-P CHLOR.	AFTER B-P CHLOR.	CHANGE
Total Bact. per ml (Average)	78.	8.3	−89.3%
Indicated Number Gas-forming Organisms per 100 ml—Filtered Water	4.06	0.022	−99.4%



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